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THE SCOTTISH
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THE SCOTTISH NATIONAL RED CROSS HOSPITAL, KROONSTAD, ORANGE RIVER COLONY, SOUTH AFRICA

By HENRY E. CLARK,
Senior Surgeon, Glasgow Royal Infirmary ; Surgeon in Charge

ON the voyage out the members of the staff of this Hospital often speculated on their possible destination. They did not imagine for a moment that they would be kept at the base, although this was sent out as a "base hospital," and opinion generally ran in the direction of assuming that we should be located somewhere in the Orange Free State. A reference to the map led us to select Kroonstad, and it was therefore especially interesting to us that we should be met on our landing at Cape Town, on May 13th, by a telegram announcing the entry into that town by Lord Roberts on the previous day. We reached our berth at the South Arm on the 14th, and on the following day received our marching orders—myself, most of the doctors, the whole of the nurses, and six of the student-orderlies being sent on by rail from Cape Town to Bloemfontein, while the Commanding Officer (Col. H. Cayley, I.M.S.), one doctor, the rest of the staff and the whole of the equipment were to go round to Port Elizabeth by the steamer which brought us from Southampton, and from thence travel by train. The destination of the Hospital was Kroonstad. I was able before leaving Cape Town to take a flying visit to Wynberg and to inspect the hospitals there, and was fortunate enough to fall in with Prof. Chiene, from whom I experienced much kindness, and who was able to give me useful information and advice.

Our journey to Bloemfontein was rather monotonous, but

still presented many points of interest. To go on day after day and night after night through a country altogether new to us, to find the line everywhere dominated by "men in khaki," and to call now and again at stations with names familiar to us in telegrams or despatches, these things gave variety and interest to our journey. The country was looking its worst, for it was now well into the winter, and the few trees we saw beyond the environs of Cape Town were bare, and the veldt was brown and dry. To us it looked a dismal and most unattractive country, and we sympathised a little with the remark of one of our students, who said he could have understood if we had been fighting to *get rid of such a country*, but fighting to keep it he could not understand. Our early impressions were, however, corrected by further knowledge, and especially by our return journey in the spring, when we found the country carpeted with flowers for about 500 miles, and were charmed with the beauty of the Hex River Valley and the Paarl district. At Naauw Poort we were joined by the matron and two of the nurses of the Edinburgh Hospital, who travelled with us to Norval's Pont, where we were met by Sir James Clark, Dr Wallace, Dr George Chiene and Dr Watt, who "showed us no little kindness," and did their best to help us on our journey.

We found ourselves at Bloemfontein on the morning of Friday (having left Cape Town at 9 P.M. on the previous Tuesday), only to find our further course stopped by the breakdown on the railway running north. Five days we stopped at dusty, dreary Bloemfontein, chafing much at the enforced inaction and eager to get to work. I can fancy that in times of peace Bloemfontein is a pleasant enough place to live in, for it has fine, wide, straight streets and boasts many really beautiful houses. But when we saw it the dust had been churned up for nearly three months by the constant tramp of infantry, the rushing to and fro of horsemen, and the incessant grind of artillery, bullock-wagons and ambulances. Moreover, we were confronted on all sides by hospital camps, and seldom went for a walk without seeing gruesome forms being carried to their last resting-place in the neighbouring veldt. We tasted the dust in our food, suspected the water, and suspected even more the mission of the crowds of flies that covered the surface of the sugar

or jam on our dinner-table. The hospitals then at Bloemfontein were Nos. 8 and 9 General in tents, No. 10 in buildings in the town, No. 5 Stationary in the Raadzaal, the Portland, the Irish, the Langman, the Yeomanry Field Hospital and, I think, two other field hospitals. It will thus be seen that whatever deficiencies there were in hospital accommodation in Bloemfontein in the early days of the occupation, these no longer existed. The staff of the Welsh Hospital, like ourselves, were "stuck up" at Bloemfontein, but they had a longer wait than we had, and their staff did not have our good fortune in escaping infection from enteric fever. From Bloemfontein to Kroonstad (123 miles) took 24 hours to travel, and we reached the latter place on the morning of the 25th May to find plenty of work awaiting us in the several temporary hospitals, where about 600 cases (mostly enterics) had been crowded together. Two days later Col. Cayley, the rest of the staff, and the equipment (but not the nurses) arrived, and we set to work to get our goods removed to our camping-ground.

The site of our camp was a pleasant slope on the town lands immediately above the station, and was partly enclosed by a ridge marking the course of the main water-supply pipe coming down from the reservoir on the hill above. Our work of organisation was much retarded by the difficulty of getting means of transport, and by the fact that our goods had been dumped down beside the railway some distance away, where it was at first arranged our camp was to be. Notwithstanding these difficulties we got tents pitched and all ready for receiving patients a week after the arrival of the equipment, and only three weeks after reaching Cape Town. Our experience of the hospitals at Wynberg, Bloemfontein and Kroonstad led us to expect we should have little surgery, but no sooner did Lord Roberts cross the Vaal than things became lively in the Orange Free State, especially in the Heilbron, Lindley, Kroonstad and Bethlehem districts. When we reached Kroonstad it was a very sleepy and dull place, occupied by a mere handful of troops, but in the early days of June we had somewhat of a scare, which led to the undertaking of extensive entrenchments, the fortification of the hill above our camp, and the sending up of reinforcements. Henceforth it became a large and constantly

increasing military camp, and as all the troops, guns, stores, etc., for the front had to be sent through the station, we were always kept lively and interested.

The surgical work in our hospital was considerable, though we never had any degree of pressure such as we experience in hospitals at home, for our staff was large.

The first contingent of the hospital, consisting of staff and equipment for 100 beds, left Glasgow on April 20th, the second for 200 beds on May 18th, and the third for 220 beds on July 18th. We had thus by the end of August staff and equipment for 520 beds, the full number for a General Military Hospital. As a matter of fact the largest number of beds ever available was about 300, for by the time the last contingent reached us the pressure was over, and we did not feel called on to erect additional tents when so many beds were unoccupied.

While I took general oversight of the surgical cases my juniors attended to such cases as came into their own wards, and many of the operations performed by me were, consequently, reported in their journals. Further, Mr Luke, who during most of our time out there shared the surgical work with me, naturally kept his own records. I am thus able to give only a partial view of the surgical experience of the hospital, as I must confine myself to the cases recorded in my own journals.

The total number of surgical cases treated was 427, and of these 117 were under my immediate care. The following table gives a list of the diseases and accidents treated :—

Gun-shot wounds—		
Of head and neck . .	9	
„ upper extremity . .	13	
„ trunk	2	
„ pelvis	2	
„ lungs	4	
„ lower extremity . .	24	
	—	54
Traumatic aneurism of femoral artery . .		1
Concussion of brain		1
Varix and varicose ulcers 2, varicocele 2 .		4
Hernia—inguinal 1, ventral 1 . . .		2
Diseases of the eye		7

Simple fractures—Colles 1, femur 1, clavicle 1	3
Contusions and accidental wounds	10
Stricture of urethra 3, hæmorrhoids 3	6
Synovitis of knee	4
Abscesses	4
Mastoid disease	1
Veldt sores	3
Empyema	1
Flat-foot 1, sprained ankle 1	2
Bursitis	2
Rider's sprain	2
Appendicitis	1
Tonsillitis	1
Periostitis of lower jaw	1
Septic dermatitis and eczema	2
Scalds	1
Hammer toe	1
Contusion of chest	1
Sebaceous cyst	1
	117

The only interesting cases are those of gun-shot wounds, and among them might have been included the traumatic aneurism of the femoral artery. The particulars of that case have been published elsewhere, as have also several of the more important cases of gun-shot wound. A few notes of other cases are here given.

1. J. Y., age 28, 54 I. Y. A Mauser bullet had entered the right side of the face in the naso-labial sulcus, passed through the roof of the mouth close to the inner side of the gum, then gone through the tongue and floor of the mouth, emerging slightly to the left of the middle line beneath the chin. He was wounded at Lindley on May 30th, reached our hospital on June 7th, and was so far recovered as to be able to be sent to convalescent camp on June 12th.

2. J. S., age 18, 4th Derbyshire (Sherwood Foresters). Mauser bullet wound about two inches below right posterior superior spine of ilium; this was assumed to be the wound of entrance, and it was supposed that the bullet had lodged. The use of the X-rays demonstrated that no bullet was present, and a more minute search resulted in a small healed spot being

found at the right side of the perineum, not larger than a pea, and situated close to the edge of the gluteus maximus. I was inclined to regard this as the wound of entrance, and the one at the back of the pelvis as that of exit, but the patient was quite clear that he was struck at the back. About a fortnight after the injury he developed well-marked neuritis of the great sciatic nerve and its branches, from its exit from the pelvis to the terminal filaments of the plantar nerves. From the course taken by the bullet we could not believe that the trunk of the sciatic had been touched, but regarded the injury as one of the sacral nerves at their emergence from the sacral foramina.

3. R. D., age 19, 4th Derbyshire. Wounded at Rhenoster Spruit on June 7th. Wound of entrance at left buttock, three inches behind, and two inches above the great trochanter; bullet had lodged. A skiagraph of the pelvis failed to show any bullet, and an exploration under chloroform was undertaken. The wound was found to pass clean through the dorsum of the ilium, and on the inside of that bone appeared to have passed upwards towards the abdomen. The X-rays were consequently brought to bear on the abdomen, and a shrapnel bullet was found lying opposite the transverse process of the first lumbar vertebra on the left side. Our localiser had not arrived, and we thus had no means of ascertaining the depth at which the bullet lay, so that, as it was causing the patient no inconvenience, we determined to leave it alone.

4. Lt.-Col. W., wounded at Rhenoster on June 7th, admitted to our hospital June 15th. Mauser bullet had passed through the middle of the attachment of the left sterno-mastoid to the clavicle, just skirting the bone and avoiding both the carotid artery and internal jugular vein, and emerging behind at the posterior border of the scapula near its superior angle. From the position of the wound of entrance, one would say that it must have passed through the internal jugular, but there was no extravasation of blood. It certainly passed very near to the dome of the pleura, but there was no indication of pleura or lung being touched. The bullet had, however, injured some of the nerves entering the brachial plexus, and as there was paresis both of sensation and motion in the area of distribution of the ulnar nerve, it may be concluded that the nerves injured were the last cervical and first

dorsal. He had also sustained other injuries, namely (1) a bullet graze of the left side of the chest at the level of the sixth rib; (2) a bruise of the left elbow below and behind internal condyle; and (3) he had a sub-conjunctival ecchymosis of the right eye, probably produced by a "splash" of earth thrown up by bullet or shell. Beyond pain from some descending neuritis of the injured nerves, and inability to use the left hand he suffered no inconvenience. He was sent down to Cape Town with the idea that he would be invalided home; while there, I understand, he had a slight attack of enteric fever, and on becoming convalescent was able to rejoin his regiment.

5. Lt. L. S., wounded on June 27th near Lindley with a Mauser bullet. The wound of entrance was between the tibia and fibula at middle of outer side of left leg; it was small, healthy, and almost healed when patient was admitted to our hospital on July 14th. The wound of exit was at inner edge of anterior surface of tibia; it was large, irregular and suppurating, and led into a large cavity containing numerous spicules of bone. On opening up this the cavity was found to be practically filled with bits of broken bone, most of them detached, but some adherent to the periosteum. The detached bits were removed, and the cavity cleared out and made as far as possible aseptic. In spite of this splintering the tibia was not broken across; the outer wall, although drilled by the small hole for the passage of the bullet, being sufficiently strong to maintain the continuity of the bone. It was plain that the bullet had been a "soft nosed" or "expanding bullet," which, after drilling a clean wound of entrance, had expanded and split up the bone before passing out. We met with a few instances of this character, but with no example of the use of a true "explosive bullet."

6. A. F., Tasmanian Bushman. Mauser bullet wound of chest at Lindley, 27th June, admitted to hospital July 14th. Wound of entrance an inch below and internal to inferior angle of scapula of left side; exit at lower border of fourth rib, inside line of anterior axillary fold, and 2½ inches behind nipple. The bullet had thus traversed the left lung, but both wounds were healed. There was an extensive dull area at base and middle region of left lung at back, the movements

at that side of the chest were limited and there were no breath sounds. Four days after admission the aspirator was used and 12 oz. of fluid blood removed from the pleural cavity. The temperature ran up nightly to about 102° F., but fell in the morning to 100°, and on August 12th the evening temperature was 103° F. Thinking this indicated suppuration I again aspirated but only obtained about 5 oz. fluid blood and no trace of pus. The case remained for some time much of an enigma. The idea of enteric fever suggested itself, but there were no spots, and diarrhœa, though occasionally present, was not a marked feature of the case. The condition of the chest suggested that there was much blood-clot present, and that it was very slow in becoming absorbed, but this was scarcely sufficient to account for the temperature, especially as on one occasion the evening rise touched 105° F. The blood was somewhat later submitted to examination by Widal's test, applied by Dr Dodgson. It gave a definite reaction in a dilution of 1-160, so that there is no doubt the case was one of enteric fever.

7. J. W., engine-driver. Was driver of the engine of the train which was "stuck up" at Holfontein by the Boers on August 3rd. He got off to uncouple the engine with a view to running down to Geneva to fetch up troops, when he was fired at and struck on the inner side of right knee below patella; there was no wound of exit. The wound was explored on August 6th, but no bullet was found, but only some small bits of metal suggestive of a "splash" from a bullet which had struck some metal on the engine. The wound did well and healed without trouble, but a week later the other leg (the left) became cold and painful, its colour was bluish, and when pressure was made the blood was very slow in returning to the part so pressed on. Pulsation could be distinguished in the femoral at the groin, but was indistinct in the popliteal. At the middle of the calf the leg was swollen, hard and tender, and there was no doubt that the popliteal vein, and some of the larger trunks going into it, were thrombosed. The case is an interesting one, especially as the thrombosis occurred in the leg which was not injured. He made a slow but satisfactory recovery.

8. Major F. C. B., wounded near Zand River, June 29,

admitted to our hospital July 14th. Wound of entrance near middle of right clavicle; exit behind posterior border of scapula at junction of middle and upper third. There was considerable disability of right arm and hand, and it was clear that the bullet had passed through the brachial plexus; it was also probable that the upper lobe of the lung was traversed. At the point where the bullet skimmed the clavicle, there was a triangular backward projection as if some fibres of the bone had been driven back on the brachial plexus. Exploration under chloroform showed that this was not so, but that the projection consisted entirely of cicatricial tissue, the clavicle being uninjured. The cicatrix, however, dragged on the plexus and certainly was accountable for a good deal of the disability in the hand; it was therefore freed as much as possible, both from the bone and nerve strands. This little operation was rendered rather difficult by adhesions between the external jugular and other veins and the cicatricial tissue, and the separation of these led to lively hæmorrhage. The wound healed well and improvement took place in the power and movements of the hand, but he suffered a good deal from descending neuritis. He was invalided home; and since I returned to Glasgow, I have had a letter from him announcing his return to duty in South Africa. That he should have so soon regained the power of his hand is more than I expected, but his handwriting demonstrates that the recovery is still incomplete.

In the 117 cases of which I have notes, there was only one death, that of a man who had a Lee-Metford bullet lodged in the popliteal space. When I first saw him at the Kroonstad Hotel on the day of my arrival, I found the wound septic and his condition not very satisfactory, and after several weeks I was compelled to amputate at the thigh, unfortunately with a fatal issue.

Among these cases there is no instance of venereal disease, and among the whole of the surgical cases (427) there were only two entered as syphilis and four as gonorrhœa. It is probably a *record war* in this respect, as in so many others, for I understand the experience of all the other hospitals was in this regard much the same as ours. During the period of our residence at Kroonstad fully a third of the whole army in the

field passed through that town, and we thus can speak with some authority as to the conduct of our soldiers. We can speak of them in the highest terms, for their patient endurance, sobriety, kindliness and good conduct. We heard out there no rumour of any ill-treatment by them of Boer women and children, and believe such stories are pure fabrications.

I cannot close this brief paper without an acknowledgment of the services rendered to us by officers of the medical, transport, engineering, and commissariat departments of the army. Without their willing assistance we should have been able to accomplish little.

THE WAR ESTABLISHMENT OF THE R.A.M.C.

By ROBERT STIRLING, M.A., M.D.,
Surgeon, Royal Infirmary, Perth; Surgeon-Captain, 4th V.B. Royal Highlanders; Civil-Surgeon, Scottish National Red Cross Hospital, South Africa

THE profession and the public are awaiting with interested expectancy the publication of the report of the Hospitals Commission, which it is to be hoped will deal not only with alleged defects of our army medical organisation, but with the wider question of its future possibilities.

Any civilian doctor who was privileged to share the burdens borne by the Royal Army Medical Corps in the present war, and who loyally identified himself with its difficulties, must be aware of the outstanding facts, viz., that the corps is numerically deficient, and that the plan adopted in the present instance, to add to its numbers is far from satisfactory.

At the same time, unless his experience has been exceptionally unfortunate, he will admit that the officers of the corps, its nursing sisters and a large proportion of its personnel compare favourably with civilian practitioners, hospital nurses, and many male medical attendants.

Frank and cordial admission should rob criticism of the charge of hostility or of personal pique.

This declaration is not wholly unnecessary, as it is needless to deny that in some instances a misunderstanding arose between the imported civilian element and the military medical officers.

The cause of the numerical deficiency is not hard to discover—it is simply the outcome of a consistent under-estimate of the requirements of the medical department, largely due to a cheerful optimism which trusted that Britain would never be called upon to supply the needs of more than two Army Corps in the field.

The ordeal through which the nation has passed, and from which it has as yet barely issued, has rudely shattered this belief. It is questionable, indeed, whether the necessities of home and Indian stations could be supplied if only 60,000 men were in the field; and when the total rises to 270,000, it becomes impossible to meet the demand.

Importunate agitators for a larger establishment have been silenced by these replies to their representations, that financially it was impossible to provide an increased staff, and that it was unnecessary, since a Reserve drawn from volunteer officers and men was already available.

How far this Reserve has been utilised let this present war tell; it is a delusion and a snare as now constituted, and as an organised system has no existence.

The volunteer medical organisation is in itself inchoate, quite unfitted for the trials of active service, and wholly unable to reinforce the regular army without completing its own disorganisation.

In this war the so-called Reserve has not been called upon, for the reason, I believe, that its mobilisation would have proved a hardship to many of its members, and that as a body it was not capable of assimilation, an argument which proves its uselessness with the regular forces, and the light esteem in which it is held; its organisation would otherwise have received more attention long ago.

As at present constituted the best reform is its total abolition.

Instead of attempting to mobilise an impossible Reserve, the War Office offered inducements of a most attractive nature to civilian volunteers, men under thirty-five years of age, for temporary enlistment in a half-hearted way, granting pay to the youngest tyro which rivalled that of a major in the R.A.M.C., while giving them no temporary rank; a plan satisfactory to neither civilian nor soldier. Thus a temporary difficulty was

overcome after a fashion, but it is a method not likely to be employed in the future.

The two classes never amalgamated thoroughly, and but for the unwarranted attacks upon a very competent body of men, in my opinion a wide breach would in many cases have arisen between them. Some civilians are imbued with the idea that military surgeons are incompetent.

Because some medical men join the R.A.M.C. to escape the struggle of civilian practice, and because others become overwhelmed with the details of departmental duty as they rise in rank, it is forgotten that many have distinguished themselves both as investigators and as practical men, utilising in their Indian service such opportunities as are only given to a few.

Space forbids proof of this statement, well-informed medical men are aware of the fact.

The unjust imputation of professional inferiority under which the R.A.M.C. writhes, breeds superciliousness in the civilian, and aggressiveness in the soldier.

This attitude, combined with lax disciplinary powers over the men on the part of the civilians and with the absence of due subordination to his military superiors, makes loyal co-operation depend largely upon mutual adaptability.

Such a condition of affairs may weather a crisis, but it does not provide a system.

This haphazard arrangement found its complement in the acceptance by the military authorities of hospitals equipped by private or public generosity, staffed by civilians and linked to the army by a military medical officer in administrative command. Such hospitals were transported to their destinations at the Government's expense, received rations as in a purely military hospital, adopted the nomenclature of the army medical department, and generally conformed to its regulations to the extent of their knowledge and ability.

These hospitals did much excellent work and greatly relieved the pressure on the R.A.M.C., receiving as reward the gratitude and commendation of the military authorities. I question, however, whether this expedient deserves repetition.

The stimulus of novelty and pressure of interesting work may maintain cohesion for a time, but such scratch organisa-

tions, even with a large bank balance and willing workers, lacks some of the elements of permanency.

Even the desirable bank balance becomes a source of evil, permitting luxuries a critical public might deem extravagances and giving rise to comparisons unfavourable to regular military hospitals.

Further, they lack the mobility desirable in the field, and unless the personnel is most carefully selected, are very dependent on the engineers and regimental fatigue parties for many duties undertaken by the R.A.M.C. orderlies.

Once erected, they are not easily moved, and may readily be left stranded by the tide of war.

In fact, except as base hospitals capable of wholly supplanting the departmental, they had better be counted out.

In the present war I should have given them almost complete, if not entire control of such centres as Cape Town, Port Elizabeth, East London, or Durban, and have despatched the orderlies and army medical officers up country.

It would no doubt have been found necessary to leave a limited army staff to regulate invaliding and the military classifications and returns.

Provided uniformity in such returns is observed, there is no necessity why such attached hospitals should be run on strictly military lines. It is impossible without the experience which training alone can give to observe the routine details of a military hospital.

It would be better to wholly discard military methods and conduct the hospital on a model more in accordance with the training of the medical and nursing staff. In short, the work should be carried on just as in civil hospitals at home. Such a plan would obviate the overlapping of duties and division of responsibility between the nursing sisters and orderlies.

In the field or on the lines of communication the number of nursing sisters might be greatly reduced, while at such base hospitals as I have referred to the nursing might with advantage be left almost entirely to the sisters.

The conclusions arrived at after a fairly extensive experience are, that the augmentation of the R.A.M.C. through civilians and civil hospitals does not supply that homogeneity and elasticity essential to the needs of a great war.

A short survey of the present system serves to show that the Army Medical reserve of nurses possesses the requisite qualification for the selection and supply of nursing sisters—of these there are sufficient available ; but no existing organisation can efficiently meet the demand for medical officers and orderlies.

The St John Ambulance Association has certainly proved most useful in supplying orderlies, but as a rule these men do not possess the all-round capacity of the R.A.M.C. orderlies.

One is apt to forget that the first-class R.A.M.C. orderly is a highly trained man belonging to a class which has risen through merit and passed many examination tests. The crying necessity is to increase their numbers.

The work which the St John Ambulance Association has been able to do, indeed leads one to believe that if the Red Cross Society gave its attention to the fuller development of the St John and St Andrew Ambulance Associations, an efficient medical reserve of civilians could rapidly be created. All such civilians while on war establishment should of course be subject to the Army Acts.

Every large centre of population might furnish the nucleus of a bearer company, field or base hospital, drawing its medical and nursing personnel largely from the staffs of hospitals, supplemented by others engaged in private work.

I do not doubt that, with a distinct purpose in view, a sufficient number of men would devote their time to acquiring proficiency in orderly work, feeling that they belonged to a definite unit. Yearly or biennial mobilisation for a short period of training in camp duties at a large military station would complete the *esprit de corps* essential to discipline. When mobilised I think they should be paid.

The Red Cross Society could command all the best talent of the medical and nursing profession at a comparatively small expense.

One or two leisured enthusiasts in conjunction with the War Office might easily work out the details of organisation and equipment.

One thing is certain, either the civilian must in peace time prepare himself to act along with the soldier in time of war, or the Army Medical Department must organise a large and purely military reserve.

Medical men eager for war experience can always be procured by granting them temporary rank up to that of captain; and by definitely placing them on the army establishment for a specified time, reasonable efficiency is possible.

These men, however, are necessarily ignorant of many matters with which the army officer is well acquainted, and are apt to fail in questions of military discipline.

In my opinion the best plan would be to enlist a large reserve both of officers and men, annually mobilised in military hospitals and paid during such periods of training.

They should form an integral part of the army, and both rank and file should only rise to the higher posts by passing examinations identical with those to which linesmen are subjected.

It might indeed be advantageous to give the orderlies a permanent retaining fee in addition to full pay when mobilised for training or service.

This short paper does not exhaust the subject, but it suggests two schemes capable of producing a reserve to augment the regular forces should necessity arise.

ORDERLY MEDICAL OFFICER FOR THE DAY ON THE LINES OF COMMUNICATION

By CIVIL-SURGEON GRAY,
Aberdeen

THUD! thud! thud! thud! I am rudely awakened by the smacking of a hand on the canvas. "Train's w'istlin' for the bridge, sir!" "All right, what's the time?" "'Alf past three, sir," but the orderly cannot add "and a mauchy morning," for the atmospheric conditions are the purest and most stimulating even at this early hour. As I slip on my breeches and tunic over my pyjamas, and hunt out a muffler, I hear the straining panting puff of one of these huge American engines as the "sick and wounded" train toils over the ridge that intervenes between the hospital and the Orange River Bridge—distant about a mile and a half. We had been warned overnight of the dispatch of this train from Modder River with 150 sick and wounded, and that we had to provide for them; so I knew that, as Orderly Medical Officer for the day, I should

be roused early. It was one of the first trains to travel from Modder by night since Roberts' great advance had cleared the countryside.

I pass by the "Boer laager" with its fifty odd prisoners, respond to the sentry's challenge, thinking, "Poor beggar, you will be glad that your go is nearly finished," and arrive at the siding close by the hospital while the train is still nearly a quarter of a mile away. The sergeant-major has turned out a fatigue bearer party, but we decide that only the urgent cases will be moved, and that the others can wait till the day orderlies, and more important, the sisters, come on duty. The train draws up. The engine-driver and stoker, dead beat, tumble out and drop, already asleep, on the sand by the side of their engine. We find the sleepy medical officer in charge, and ask for serious cases. "Not many." "All right, we'll manage. When were they fed last?" "Nine P.M., Modder," and he falls asleep again. Half-a-dozen bad enterics are taken to the huts, and one or two uncomfortable wounded. One poor chap we find, sitting pale and greenish. "What's wrong with you?" "Wounded, sir, above the temple, sir." "Been vomiting?" "A little, sir." "Squeeze my hand—now the other one." "The right one is weak and stiff, sir." He is removed and two days later has a big splinter of bone extracted from its bed in the cortex cerebri. The remainder are nothing loth to stay where they are, for the berths in the carriages are luxurious beyond measure compared with what they have been accustomed to lately.

I have a look at one or two of our old most serious cases, and turn in again to have a snooze, and have just dropped off when—Thud! thud! again. "Hullo, what's wrong?" "Will you come to No. 7 sir, poor Gowrie has just passed away, sir." It is the ward-master this time, and I go to confirm his statement. I find the orderly in attendance, fan still in hand, and somewhat dazed, for this is the third or fourth death in this hut during the past four-and-twenty hours. It used to strike us civilians as being rather odd, that during the last few minutes of a man's life it should be thought the proper thing to fan the man vigorously. I never found out why it was done, but it seemed to be the universal practice among the orderlies.

This No. 7 hut, by the way, was famous in the neighbour-

hood. At the time I speak of, there were but three sisters at Orange River, one for officers, one for surgical cases, and one for medical. It thus came about that the most serious medical cases, practically all enteric, were put into No. 7 to have the benefit of a nurse's care. Twenty-two patients there were, each bad enough to be certain of a special nurse at home. I have seen fifteen or sixteen of them more or less delirious at one time, and one sister with three volunteer orderlies to look after them. Two orderlies were pretty fully occupied in drawing rations and water, washing up, and various other ward-maid and porter duties, so one can imagine the work of the remainder. The "enterics" came chiefly from Modder River, and seemed even a worse type than they had there, probably because of the evil effects of travelling.

I get back to my tent and have my morning "tub," hearing in the intervals between splashing the mournful morning "dirge" of the Boer prisoners (they seem to choose most lugubrious tunes for their morning hymn of praise), and scribble a few lines home, for it is mail day. When Thud! thud! "Are you coming to breakfast, Gray?" shouted in a homely Glasgow tongue, makes me reappear right willingly, and accompany one of my fellow civil-surgeons to our mess, where we meet the doctor from Modder, whom I ply with questions about friends there. He tells me of a famous surgeon who has made himself a great favourite there—how that a few nights before in a storm of wind and rain this surgeon's tent had collapsed, along with several others, and that the help of a relief party had been scorned—"Oh, never mind me, I am quite comfortable. Help the others." One cannot reproduce the characteristic intonation, but one can appreciate the scene—this great man, under the wet and clinging canvas, every limb outlined! How he got out I know not, he must have been a bonny mess!

But stern duty recalls us! Another orderly—"Wanted at the cook-'ouse, sir." As I approach it I am aware of a very unsavoury smell. "Medical Officer, 'shun!" shouts the head cook. "Meat's bad, sir!" It certainly smelt bad and kept me at a respectful distance. So we condemned it. However, during my forenoon hospital visit came another orderly, Army Service Corps, with a request to "Inspect some meat, sir, if

you will, sir." So I am informed that the half carcase I had condemned had been lying near the door of the frozen meat van on the railway siding, and thawed on the surface, but was quite fresh below, and "I don't think it's necessary to condemn it, when we cut this piece off, sir." Decomposition, like beauty, is but skin deep sometimes!

After breakfast the first duty was to dispose of the men in the train, who had meantime been served with beef-tea, milk, and so forth. Remember, we thought the hospital was full enough already? It was decided to use this train for transfer of convalescents to Cape Town, so medical officers were soon busy selecting suitable cases. How well all the men were this morning who had any "spunk" in them! The chance to get down to the sea for a week or two even was an excellent tonic and possibly this meant *home* in a few weeks. How the one "typhoid" cussed his temperature chart, and his neighbour eagerly reminded you that he had been on "full rations since yesterday!" The only man, who could talk sensibly, who was ill on such an occasion was the malingerer, and he felt "very bad this morning, sir," and accordingly was usually too bad to travel.

The patients on the train were gone over roughly by me, to find out to which huts or tents they should be sent. The vacancies in each hut were ascertained and a corresponding number of slips of paper with the number of the hut on them was made. Each man then got a slip of paper, and the orderlies knew to which hut to take them. Those who were only slightly ill were put into a large marquee and were examined again more carefully, and as a result some cases were sent down the line with the departing train, and others likely to be ill for only a few days were accommodated with blankets and kept in the marquee, which contained probably forty men. Many of them developed enteric fever, and were then transferred to the huts. How difficult it was to diagnose incipient cases, and what a temptation to put them down as S. C. Fever (slow continuous fever), which term covers such a multitude of sins of both omission and commission!

The usual morning round gets but scanty attention on a day like this. "Only the important cases to-day, sister!" Yet one must give a word of warning to those who are going away,

against indulging in the many good things which are pressed on them by kind but not over wise friends on the way down to the base. It is extraordinary how these men pick up on the journey. The train goes easily and soothingly along, no dashing break-neck jolting and swinging round corners! Fifteen miles an hour is a good express speed! The effect is excellent on one's patients, if these are properly convalescent. One sees an improvement at every stopping place: they are more and more ready for "grub," and the supply of this commodity, in pleasing variety, is equal to the demand as Cape Town comes nearer. I remember one man saying to me in reply to a query as to how he was getting along, "Oh, I wish we could have a few days more of this, sir!"

At the end of the "ward" visit, the ward-master produces the diet sheets, but another orderly appears and salutes. "Eleven o'clock, sir, casual sick waiting!" I "confound the diet sheets," which have to wait, and go off to "take the admission," *i.e.* to see the sick from the camp around us or who may have come by train from the nearest stations. These are seen at the "dispensary," and a suitable medicine prescribed, No. 9 pill being a great favourite, or else temperature taken and the patient kept for inspection again in the evening, when he is either admitted or discharged to "attend hospital for a day or two." All this is done very much in the open air.

Among these cases may be a Boer prisoner, attended by his guard with fixed bayonets, and attempts at Dutch speaking usually provoke a smile, else he is very ill or very boorish!! Or a visit must be made to the laager, where the examination is watched with great interest by the patient's fellow-prisoners. As time wore on the number of these prisoners increased greatly, and because of the large number of wounded amongst them a special Boer hospital was made up in the laager—before this bad cases were put amongst our own men.

But I am digressing again. I take time to go to my tent, leave out my letters for home, to be posted by my servant, have a drink, for it is hot work being so much in the blazing sun, and I find the temperature even in my tent, a double fly one, is 105° F.—outside about 30° more than that. Then off to superintend the entraining of the convalescent

patients, who are now assembled at the siding. I nearly said drawn up in line, but it is a rickety sort of line, and one can't be exacting as to formation under the circumstances; so the men sit on their kits or lie out on the sand, for it is rather a weary business for them, until all are entrained. The more serious, weaker cases, practically all convalescent enterics and men with wounded legs, are "lying-down" cases, and are placed in first-class carriages, as far as possible, after the officers have been accommodated; second grade cases in second-class, and the others in third. The carriages and lavatories are then inspected, provisions for the journey, suitable for the cases put on board, and the train is ready for departure, except for the medical officer told off for duty on the journey and who is practically "boss" of the whole show, railway officials included.

In the midst of all this, however, the inevitable orderly appears from the cook-house and I go to inspect the dinners. "Medical Officer, 'shun!" and the ladle, spurtle, or poker comes to the "shoulder" while its holder springs to attention. The salute is returned, the lids are removed from the "dixies," and the contents of each are stirred up by the head cook with "Beef-tea, sir," "Soup, sir," "Rations, sir," "Milk, sir," in turn, and "No potatoes to-day, but onions, sir." About that time our sisters had paid six shillings for one boiling of potatoes, so one could not expect that they would be forthcoming here.

The food, having been inspected, is then issued to the orderlies from the various parts of the hospital, and then follows the visit of the Orderly Medical Officer at meal time to hear and inquire into "any complaints," if such be forthcoming. Here again the voice of the malingerer is more apt to be heard than of the *bona fide* sufferer.

The duties of the afternoon are not onerous, although rumours are in the air of an examination as to the fitness of over a hundred "details"—convalescent cases who have been employed in light duties about the camp—but that is postponed till to-morrow or next day! An odd visit or two to the huts to prescribe for urgent developments, two or three more casual sick to see, and a gallop across to the C.I.V. camp to an officer who has come by an accident, fill in the

time till afternoon tea with fellow civilian workers and other officers on duty at this camp. These teas are bright spots in the routine life, and the visitors do not often cut their visit short when the conventional quarter of an hour is up. One New Zealander used to "object" in a mild way, because he got so home sick afterwards!

After tea those not on duty went off for a stroll to the river or up to Fort Munster, or for a canter over the veldt, while the Orderly Officer lay low until the approach of a firing party to perform the last obsequies for "poor Gowrie" reminded him that the time for evening visit was at hand. It always gave me a fit of "blues" when I saw the funeral party winding slowly over the veldt to the cemetery at the foot of the kopje, "Signal Hill," half a mile away.

Evening visit, dinner at 7.30, smokes, small talk, and perhaps a stroll up and down in the glorious moonlight—at a respectful distance from the Boer laager to escape constant challenge —complete the day, save for another visit round the hospital at about 10 P.M. to "see that the orderlies are alert" and that everything is in order.

Next morning the doings of the day must be couched in report form and handed to the Senior Medical Officer. I wonder how often he reads these reports!

(In reality the O. M. O. is on duty from 9 A.M. on one day to 9 A.M. on the next, but I may be allowed a little poetic licence in an article such as this.)

KROONSTAD, MAY—SEPTEMBER 1900

By JOHN M. COWAN, M.B.,
Physician to the Scottish Branch Red Cross Hospital

THE S.B.R.C.H. left Southampton on April 21, and arrived at Cape Town on May 12, the day on which Lord Roberts entered Kroonstad, and it was at once ordered to proceed to that place.

Most of the staff preceded the equipment, and we arrived at Kroonstad on May 25 by the first train, only a couple of days after Lord Roberts had moved northwards. I thus saw Kroonstad at a time when its accommodation for the sick was most severely taxed, and though Mr Burdett-Coutts' hysterical

denunciations of the hospital administration in South Africa have been almost forgotten, I have thought that a statement of what was done at Kroonstad before the railway was open might be generally interesting.

Kroonstad, it will be remembered, is 138 miles north of Bloemfontein, and the army of the main advance leaving the latter place about May 1 reached it on May 12, and remained there for about ten days. Owing to the conditions which obtained in Bloemfontein, sickness was at this time very rife among the troops, and over 600 had to be left behind when the army moved on. All the railway bridges had been blown up by the Boers, so for thirteen days after the occupation of the town rail head was at Zand River, a considerable distance away, and all stores had to be brought to the army by ox transport. It was thus manifestly impossible for a general hospital to reach Kroonstad for a time, and arrangements had to be made to accommodate the sick in the buildings of the town.

The church was one of the buildings that was occupied as a hospital. It was large and of the usual oblong shape, and without any pillars or galleries, and with one or two small rooms at one end, which were utilised as stores. The whole of the pews had been removed from it, and mattresses arranged in rows along the sides and down the centre, on which the patients lay. A few beds, perhaps a dozen in all, had been obtained, and these were used for the most serious cases. Pillows were few in number, a bundle of clothing making a fair substitute, and there was a sufficiency of blankets. There were, of course, no pre-existing latrines, so night stools had been placed in the porches for such patients as were able to get up. In addition, tents were erected in the churchyard, which was fairly spacious, and the slighter cases were put into them: here, however, there were no mattresses, the patients lying on the ground in water-proof sheets and blankets. The church and tents contained in all about 150 patients. The town hall was also used for a short time as a hospital. It was much smaller than the church, and consisted of one large room. The same arrangements obtained as in the church. The schoolhouse was occupied by the Dutch Red Cross Ambulance, who had remained behind after the Boers evacuated Kroonstad. They had some of their

own sick and wounded, but they took in in addition as many of our men as they had room for.

Two hotels were also utilised as hospitals, but more unsuitable buildings for this purpose could not have been contrived. The Kroonstad Hotel consisted of irregular quadrangles, along the sides of which were numerous small rooms opening into deep verandahs. These rooms had no fireplaces, and the door and window opened on to the same side under the verandah: ventilation and lighting being thus very imperfect, conditions which, while bad enough in bedrooms used only at night, were very out of place in a sick room. The nursing staff, too, was always small, and it was absolutely impossible to ensure the constant attendance which can be arranged so much more easily in wards containing ten to twenty beds. It is true that these rooms were mainly occupied by officers who had their soldier servants in attendance on them, and who slept at night on the verandah at their doors; but while these men showed great devotion to their masters, sparing themselves no trouble or labour, they were generally utterly useless as nurses, especially if any delirium occurred, and it was sometimes difficult to awaken them at night. Two larger rooms accommodating some thirty to forty patients were also used, and these were much more suitable, as cross ventilation was possible in them. Bedsteads were more numerous here than in the church, but still there were many patients sleeping on mattresses on the ground. The drainage here was almost nil, what there was being very dangerous. All the evacuations were taken away at night and deposited in pits away from the town, but "slops" were emptied into gratings in the quadrangle, which led to pipes laid underneath the front buildings and opening directly into the gutter at the roadside in front of the hotel! The Kroonstad Hotel contained 130 patients when full.

The Grand Hotel was also used, and here the conditions that obtained were similar to those at the Kroonstad, save that the verandahs were on the outside, and the rooms perhaps a little more bright in consequence.

Even at this time with such a press of work there was always an abundance of milk and beef-tea, the former of course mainly tinned, while there was a large variety of stimulants. Drugs were somewhat scanty, but more in variety than in

quantity, so that although one's favourite preparation might not be procurable, there was generally an efficient substitute.

Everything is comparative. On the outward voyage telegrams from Las Palmas at one shilling a word seemed very expensive, but after wiring at four shillings a word from South Africa the Las Palmas tariff on the return voyage seemed very moderate. Kroonstad at the time when I am describing it had been cut off to a great extent from the outside world for over six months, and the stores were by no means fully stocked, while the place itself is rather a large village than a town. Under the circumstances I consider that what had been done reflected credit on those responsible for the hospital administration. Much could be found fault with; much, if it obtained in a general hospital at home, would call for severe censure; many men suffered very severely; but from a knowledge of the conditions obtaining at the time and place, I do not think that anything that was possible to ensure the comfort and well-being of the patients was omitted, and certainly no one concerned in the administration spared themselves. Seven medical men and six nurses arrived by the *first* train, as well as some orderlies, and two trucks of medical stores. No. 3 general hospital arrived two days later, and the S.B.R.C.H. next day, and at the end of the week after the railway was open (June 1), the conditions had wholly altered, and no one was suffering from imperfect attention or treatment.

Enteric fever began to be prevalent among the troops before they left Modder River and many were infected at Paardeberg; when the army arrived at Bloemfontein the latter were in the early stages of the disease and many had not entered hospital. The sanitary arrangements were at first necessarily imperfect, and the kopjes which surround Bloemfontein were soon covered with infected excreta which when dried were blown all over the camps on the flats beneath and during the rains were washed down into them; in addition, the reverse at Sannah's Post cut off the usual water supply, necessitating the use of wells which were probably already infected, and which yielded only an insufficient quantity of water, so that the epidemic spread rapidly. Preventive measures such as boiling drinking water, etc., were quite useless, as the infected dust permeated everywhere during sandstorms,

or was carried by flies into the food, etc. It was only when the main advance began and the cold weather ensued that any diminution in the number of cases occurred. During the first weeks of the main advance the number of cases of enteric fever was considerable and about 600 men, the majority probably suffering from it, were left behind at Kroonstad. After this, however, the numbers decreased, as the incubation period of cases contracted at Bloemfontein was over and but little cause of fresh infection was met with. It was a rare thing at Kroonstad for enteric cases to be admitted who had not been in Bloemfontein during the preceding fortnight, though latterly they were becoming more numerous, but enteric was never epidemic in Kroonstad during our stay there. In any statistics bearing on enteric fever the Bloemfontein factor must be taken into account, as troops who had not been there at all or only for hours suffered little as compared with those who had spent weeks or months in the town. The Wiltshire Regiment marched into Bloemfontein with two men sick, but left over 200 of their number there when they marched out some weeks later. Another point about Bloemfontein. When I was there about May 20, individual doctors in the general hospitals had charge of over 100 cases, and while sufficient attention from the treatment point of view might be possible, it is manifestly improbable that sufficient time could be spent on each case to ensure a correct diagnosis, cases being diagnosed enteric or simple continued fever, according to the individual. Treatment was imperative and I think that under such circumstances the only safe course to adopt was to treat all cases of continued fever as enteric. There are several other sources of fallacy. Inoculation was practised on the outward voyage, but in the majority of cases no record of the individuals inoculated, but only of the gross numbers, was kept. The question as to whether an individual had been inoculated or not had thus to be decided by his own word, and he might on admission be in an advanced stage of fever. Sometimes too it had been performed on the arm, and some of the men were dubious whether they had been inoculated against enteric or vaccinated! The army authorities are not fond of a reserved diagnosis, and do not appreciate many N.Y.D.'s in the returns. In consequence cases are diagnosed provisionally by the doctor in attendance,

but when the cases are transferred this provisional diagnosis may be impossible to verify or deny and the original one remains. When the S.B.R.C.H. took over the Kroonstad Hotel all the cases had been returned diagnosed, and the only diagnoses given by us were those on death certificates. Afterwards when the hospital had been evacuated and the returns were being made up many cases which had been definitely enteric were found to be returned as simple continued fever, and it was impossible at that time to revise every diagnosis. Another point appeared among the statistics of our own staff. In the end of August Dr Dodgson, of the Enteric Commission, examined the blood of forty-five members of the staff who had been inoculated twice with Dr Wright's vaccine. In the report which he kindly furnished, the following facts are shown :—

Of the first section of the hospital twenty-three were examined. All reacted to Widal's test.

Poor reaction	2
Good reaction	12
Very good reaction	7
Unusually good reaction	1
Extraordinary reaction (1 in 500)	1

Of the second section twenty-two were examined.

No reaction	11
Very questionable reaction	8
Poor reaction	1
Good reaction	1
Very good reaction	1

It is difficult to understand the differences in these results. All the cases were, when tested, in good health, and had been submitted to apparently the same procedure. The first section, however, had been inoculated about the beginning of May with vaccine which had been prepared in April, while the second section had been inoculated about June 1 with vaccine which had been supplied to the transport early in the year, and was consequently some months old. *A priori* Dr Wright's vaccine would not be expected to deteriorate in a few months, and so far as I can discover the immediate results of inoculation were similar among the two sections. The fact remains, however, that inoculation may be useless from some fault in the technique.

Not including the cases treated in the Kroonstad Hotel we had 92 cases of E.F. in hospital, and of these 11 [11·9 per cent.] died. Some of these, however, had been admitted convalescent. Of the above cases 20 had been inoculated, and of these 1 died [5 per cent.]; 72 had not been inoculated, and of these 10 died [13·8 per cent.]. The difference is very striking, but the figures are small and otherwise open to fallacy as I have shown above. Of the members of the staff 5 contracted E.F., all of whom had worked in the wards. One of these had been inoculated twice on the outward voyage, but at the time of Dr Dodysin's examination in August, his blood reacted only "very questionably" to Widal's test. He developed E.F. while on his way home in October, but made a good recovery. Another of the second section who had been inoculated once contracted E.F. and died. Of the other 3 cases 1 died; none had been inoculated.

73 members of staff were inoculated twice.	1 case E.F.	1·3%.
47 " " " once.	1 "	2·1%.
42 members of staff were not inoculated.	3 "	7·1%.

The above figures are somewhat remarkable, as all the other conditions save the inoculations seemed common to the whole staff. None of the first section contracted E.F.

Only a very careful analysis of all the cases of E.F. which occurred in South Africa will throw any light upon the value of inoculation, small numbers conveying erroneous impressions, as I believe the figures which are shown above do. I think, however, that both the susceptibility and the mortality of those inoculated will prove to be slightly less than those of the non-inoculated and probably double inoculation will prove of far greater value, but it was, however, only rarely practised.

The type of fever seen at Kroonstad was generally severe and the death-rate high, in some measure accounted for by the exhaustion consequent on cases being in mobile hospitals, or "on trek," during the early period of their illness. The cases treated in the town, in the early days of our residence, were frequently complicated by pulmonary symptoms, which indeed occurred in a great majority of those who lay on mattresses on the floor, but the cases treated in camp did not appear to be specially liable to this.

I saw two cases of parotitis in the end of May, as a com-

plication, and neuritis seemed rather more frequent than usual, a fact possibly related to the almost general use of putties.

Gastro-intestinal diseases were common. Almost everyone suffers on his first arrival in South Africa from diarrhœa, perhaps accompanied by vomiting, but the attack is usually slight, only lasting for a day or two. Men "on trek" marching incessantly and much exposed to cold and wet, and often on a dietary consisting solely of biscuit and tough meat, suffered frequently from diarrhœa, generally not very severe, but if long continued bringing on a condition of debility which sent them to hospital, but when under favourable circumstances recovery was usually rapid. The same conditions had obtained in those admitted suffering from simple continued fever, which, however, was generally slight.

Dysentery cases were fairly numerous, but the cases were usually not of a severe type (71 cases, no deaths): they did not react well to the use of ipecacuanha, saline treatment being the most successful, and there were no cases of hepatic abscess.

Rheumatism was common; the great majority of cases, however, were subacute apyretic and they rapidly improved after admission. Tonsillitis and sore throat were also common. A few cases of malaria were admitted, almost all of whom had contracted the disease elsewhere (India, West Coast, etc.). Malaria, while said to be very prevalent in Rhodesia and the Northern Transvaal, seems to be rare in the Orange River Colony. Pulmonary disease was not common. Influenza was latterly prevalent in Kroonstad town, and several cases were admitted into hospital.

A case of Malta fever occurred in a patient who had not previously been outside the British Isles. Unfortunately no bacteriological examination was possible at the time, but the clinical diagnosis seemed clear.

There was one case of scurvy. The patient who had been treated in one of the hotels from the middle of May had lived on a diet consisting mainly of stimulants and boiled milk, and when transferred in August showed distinct evidences of scurvy. The primary illness was fever, long continued and recurrent and of an indefinite type, and his blood when tested did not react to either E.F. or Malta fever. He rapidly improved on an antiscorbutic dietary.

One experiment was made by the S.B.R.C.H. All of the first-class or nursing orderlies and all the N.C.O.'s in charge of ward work were medical students, most of them members of the Volunteer Medical Staff Corps. I cannot speak too highly of these gentlemen, who underwent many real discomforts and put themselves in many cases to serious inconvenience by the postponement of their examinations in order to undertake the work of attending to the sick and wounded. If the bulk of cases had been surgical the work would have been sufficiently hard and disagreeable, but as it happened that the great majority were medical it was no light or pleasant thing to nurse in the S.B.R.C.H. The nights at Kroonstad during June and July were very cold, and a draughty tent without any fire is not the place that one would choose to sit in through the long night. Several of them had to enter hospital for a time owing to illness, but I am glad to be able to say that no one has suffered permanently, and I can only trust that the results of their work in South Africa will prove as beneficial to themselves as it was to their patients.

EXPERIENCES IN SOUTH AFRICA BY PROFESSOR CHIENE

Summary of a paper read to the Edinburgh Medico-Chirurgical Society on 5th December 1900

PROFESSOR CHIENE, in bringing before the Society some of his experiences in South Africa, desired to avoid such wider questions as Army Medical Reform, and the allegations which had been made against hospital arrangements during the war, which were still *sub-judice*; but would say a few words in reference to such matters as Ambulance, Anæsthesia, X-Rays, Hospital Trains, Bullet-wounds, Head injuries, Injuries to Blood-vessels, Sanitary matters — burning instead of burying; with a word about medical cases, and in reference to the work of the Civil Surgeon in South Africa. He had seen the four great hospitals in the neighbourhood of Cape Town. Much had been said about the state of that at Woodstock. This was an old building; and at one time it certainly was much infested with animal parasites, which gave rise to much discomfort.

This had been much improved on his second visit. He had never experienced any smell from the town drains, which were carried out some three hundred yards from the shore; and judging from the excellent results which he saw in that hospital, he could not look upon it as being unhealthy.

As regards ambulance work and the conveyance of the wounded to the hospitals, there should be a clear distinction made between the ordinary trains and the properly equipped hospital train. The soldiers were most comfortable in the latter: in the former often the very reverse.

He was fully satisfied that in every train conveying wounded men some form of apparatus should be carried by which simple cooking could be done. The supply of food at stopping-places could not be relied upon. Much had been done by the kindness of ladies for the relief of the wounded on arrival, but it was quite necessary that they should be well fed on the journey. As regards the conveyance of wounded men to the trains or from the train to the hospital, he was certainly of opinion that ambulance litters were more comfortable than ambulance carts. This was the experience of some who had been in both as injured men. It was one of the questions of the future—how best to convey the wounded from the field of battle to the nearest hospital. The Boers had used wagons and Cape carts, and these were preferable in some respects to ambulance carts. The essentials were strength, easy turning, easy motion, and that the occupants could be easily reached by the attendants. The stage-coaches in South Africa were sometimes hung on leather springs—he supposed a survival of the fittest—and he thought leather springs might at anyrate be worth a trial for ambulance carts. If the motion were too great, it often gave rise to sickness much the same as sea-sickness.

Of anæsthetics, chloroform had been the favourite; although ether was also sometimes used. He had never seen any trouble whatever from the use of any anæsthetic—merely a little struggling; no sickness at the time of administration, and very little afterwards. The question arose, is the sickness experienced in civil life to be attributed to a nervous condition which did not hold good in time of war? He found also that the soldier always accepted whatever conclusion was come to

as regards his treatment—operation or otherwise—without demur; reminding him in this respect of a patient suffering from shock, and not seeming to take much interest in his own case. This was the case even when he saw the men at the base some time after receipt of their injuries—they seemed still to be suffering from chronic shock. He could only recollect of one soldier who refused to be operated on—a different state of matters from that experienced in civil life, when the surgeon's advice is often not taken. The soldier looked upon the doctor as one in whom he could trust.

With regard to X-ray work, great difficulties had been found sometimes in localising bullets when lodged in the spine and pelvis; in the limbs there was not much difficulty, and in the pelvis a rectal examination would sometimes localise a bullet when the X-rays were found wanting. He was satisfied that a great deal depended on the skill of the man who was using the apparatus.

One thing that was evident in civil work was the distinct division of patients into two great classes. Those anxious to go home, and those who wished to go back to fight again.

To the first class belonged all the septic cases; to the second the aseptic cases. It was found also that dysentery was the disease above all others that took the heart out of a man.

He was anxious that his hearers should fully understand and realise the great value of the hospital trains and ships. In Natal the absence of corridor carriages on the railways there had rendered the Princess Christian's hospital train most acceptable. It had rendered signal service in bringing down wounded from the Tugela. In Cape Colony there were four such trains in operation, and the good they had done was incalculable. Rudyard Kipling had written on this subject, and he (the speaker) would like to see the articles, which had appeared in the *Cape Times*, reprinted; to his mind they gave the best idea of the condition of affairs. Of the hospital ships he had not much experience. Two had been fitted out in Durban, and he thought nothing could be better for the conveyance and comfort of the wounded. It was interesting to note that these two ships, though fitted up under the supervision of officers with no special experience, assisted by the

advice of Major MacCormack, had been the envy of the skilled artificers of this country. The office of these vessels in relieving congestion in the hospitals might be imagined, as they contained 1660 beds. He could not omit recording also the great services rendered by the Indian Bearer Company. Their bravery and gentleness in the transport of the wounded should be remembered.

With reference to bullet-wounds, it had been found that when a man was struck at near range the wound was more serious than that received from a distance. A wound inflicted at 200 or 400 yards was much more ragged than one inflicted by a similar bullet at 1000 or 1500 yards. Possibly the bullet was like a top and at first spins round its centre, but in time settles down in its true course. He had seen several cases of severe brain injury, which it had been suggested were the result of expanding or explosive bullets. These cases he thought might be divided into two groups—the first, those in which bone and brain were both severely injured and torn; and the second, in which there was a comparatively small bone wound though the brain was much torn. The first class he thought might be due to expanding or explosive bullets; the second possibly to ordinary Mauser bullets fired at short range. As to the green colour on some of the bullets used by the Boers which it was suggested might be poisoned, he had ascertained that the colour was due to verdigris from the copper in the nickel covering of the bullet.

Relative to head injuries, his experiences of cerebral hernia before going to South Africa had been unfortunate. But in South Africa the majority of cases were in a fair way to recovery, and in some instances it was complete. Possibly this could be accounted for by larger opening in the bone. If a hernia occurred in a small opening it tended to go on growing. With a larger opening there was less intracranial pressure. Dr Lewis Irving, an Edinburgh man, had spoken to him of the good results obtained in these cases from the use of 5 to 25 per cent. of formalin, which he had introduced as a new remedy in the treatment of cerebral hernia. It acted by drying up the hernial mass; being at the same time antiseptic. Several cases of severe brain injury followed by recovery might be mentioned. A man lying on his abdomen was

struck in the right temporal region—he spat the bullet out of his mouth, which it had entered close to his upper canine tooth. He made a good recovery. In another case a bullet was removed from the left temporal fossa above the base of the mastoid process. It had passed through both occipital lobes, causing right hernianopsia, and was localised by the X-rays. A curious thing was that the bullet was lying with its base against the bone and its apex looking in the direction from which it was fired.

Injuries to blood-vessels. Several cases of arterio-venous aneurysm had come under his notice, occurring in the neck and the extremities. Great improvement resulted from proximal ligature of the main artery in these cases in which the communication was between the carotid artery and the internal jugular vein. In the leg the aneurysm was laid open and the femoral artery and vein were ligatured above and below. These injuries were as far as he could judge more allied to aneurysmal varix than varicose aneurysm; but there was not the great dilatation of the vein generally described in cases of varix. No opportunity had occurred to make a dissection of any of the cases in the neck; but the improvement that took place after ligature of the main artery only and no interference with the vein made him wonder if the condition could be due to a bruising of the artery and vein and a subsequent matting together of the structures.

One case of arterio-venous aneurysm had made a deep impression on him. A bullet had passed through the man's neck from side to side behind the trachea, and either behind or through the œsophagus. There was found to be a pulsating tumour low down in the neck immediately above the clavicle so low down that it was doubtful if a ligature of the carotid could have been attempted. The man developed enteric, and was invalided home. Recently he heard of him jumping a six-foot wall; no operation whatever had been performed.

Injuries to the thorax. He was struck in the case of lung injuries with the absence of spitting of blood. The bullet appeared to pass through the lung, searing it, and preventing hæmorrhage. There were a great many cases, however, of hæmothorax, probably from the intercostals. Most surgeons agreed that if the blood was being slowly absorbed, tapping

assisted absorption; and there was also a general agreement that a rise of temperature was the first indication that absorption had commenced. Possibly this was analogous to the rise of temperature seen after extensive operations due to absorption of waste products. Empyema, as a result of lung injuries, rarely occurred. He had seen several cases of thoracic wounds in which, after careful examination of the apertures of entrance and exit, he could not but come to the conclusion that the bullet had traversed the heart. He had no opportunity of forming an opinion on the question of immediate operation in the case of penetrating wounds of the abdomen, but had seen several cases of complete recovery without operation. He could only imagine that as in the case of the lung, so in the intestine, the bullet makes so small a wound that no bleeding or extravasation occurs.

Referring to the question of using hotels, churches and halls for the sick and wounded: so long as there was free ventilation and the rooms fairly large, they made excellent hospitals; but as a rule tents and hospital huts were found to be better than houses. The purification of these buildings must be very thorough. He anticipated a serious outbreak of enteric fever in these places in the near future. This was a most important matter considering the flood of emigrants ready to rush north when they get a chance. There should be no delay in sending out incinerators for the purpose of burning all dejecta. Incinerators should also be placed at all stations along the railway lines to burn dejecta from the hospital trains. There was reason to fear disastrous results in the future as a result of the deposition of dejecta along the lines of railway. He trusted that Dr Boyd might be induced to give his experience in respect of typhoid and dysentery; but he (the speaker) might be allowed to say that phlebitis of the femoral vein was a complication upon which he was frequently consulted. It delayed recovery, but he had not heard of any fatal results from it. The typhoid patient generally died from exhaustion, or from intestinal hæmorrhage; rarely from perforation. As regards inoculation for enteric, there was much diversity of opinion as to its value, and it would be some time before any results could be tabulated on this point. There was a fever called in the army "Simple Continued Fever," which many held to be a form

of typhoid. He was informed that some of these patients reacted to the Widal test. Had these men been inoculated, and was the Widal reaction due to the inoculation? Abscess of the liver was found very frequently to follow dysentery. Those who had most experience of this advocated posterior aspiration; and if pus was found, the removal of a portion of rib, and free drainage. All agreed as to the importance of a very large drainage tube.

In reference to the work of the civil surgeon at the front, the professor read extracts from letters from surgeons as to the nature of the cases with which they had to deal, which he thought would best elicit the fact that the civil surgeon had been of great service in South Africa. This short paper was one of impressions—he had been constantly on the move, and the circumstances did not allow of any extensive note-taking. He might express the hope that the medical history of this war may be written with the thoroughness that the late civil war in America has been dealt with by the United States. From such a history many useful lessons might be learned; useful not only to the profession generally, but especially to the Army Medical Corps who would be called upon to serve Her Majesty in times of war.

CLINICAL LECTURES

ON

PULMONARY PHTHISIS AND ITS TREATMENT

Delivered in the Royal Infirmary, Edinburgh

By ALEX. JAMES, M.D., F.R.C.P.Ed.,
Physician to the Royal Infirmary

THE treatment of pulmonary consumption is a subject which has come into very great prominence within the past few years, so that I have no scruple in taking it up for consideration with you at the present time. But inasmuch as a rational treatment of consumption can be formulated only when the etiology and symptomatology of the disease is clearly understood, I propose to enter in some detail into this to begin with. I take as a sort of text for my discourse the case of a patient at present in the ward. It is a case which presents, as you will see, nothing very extraordinary as regards features or phe-

nomena, but, properly considered, its study will, I trust, present many aspects of suggestive interest and usefulness.

A. M., aged 40, a clerk, born in Aberdeenshire, and resident in Edinburgh, was admitted to Ward 31, October 15th, 1900, complaining of severe cough and spit, with loss of voice and weakness, all of several months' duration. His family history is distinctly unsatisfactory. His father died at the age of 50 of some cause not known, his mother died of consumption at the age of 43. He has had nine brothers and two sisters, of which number only three brothers and one sister are alive and well; two brothers had died of consumption.

As regards previous illnesses, it is noteworthy that he had hip-joint disease when eleven years old, that he was ill with this for over a year, and that his limb, the right, is now shortened, wasted and ankylosed.

His present illness, he tells us, dates from March 1899, when he had an attack of influenza. At this time he had a cough and spit, and he believes pleurisy of the left side. He was three weeks in bed, but after a short rest he quite recovered, his cough and spit ceasing, and his general health being apparently restored. In February 1900, he had another attack of influenza. Cough and spit again developed, and he felt himself much pulled down. A doctor was summoned, who told him that his right lung was distinctly affected. Gradually the cough and spit grew worse, and gradually, with loss of flesh, he felt himself growing weaker. In May last, hoarseness of voice was noticed, and shortly afterwards complete aphonia. Since this the cough and spit have become more troublesome, and he tells us that in May and June last he noticed a very slight streaking of the spit with blood.

On admission he was thin and weakly. His height was about 5ft. 6ins., and his weight only about 8 stones. He tells us that since March 1899 he has lost about a stone in weight. His temperature varies between 98° and 99°.

The alimentary system, except for a somewhat feeble digestion, is fairly normal. His circulatory system is also normal. His pulse, 78 per minute, is of rather low tension, and the arteries are slightly thickened.

Hemopoietic System. — There is no marked lymphatic or splenic enlargement. His red corpuscles are about 3½

millions, and Hb. 65°. His white corpuscles are rather under 10,000.

Respiratory System.—Breathing 29 per minute, mainly abdominal. He has a troublesome cough, with muco-purulent expectoration, showing many bacilli. On examination of his chest, we found flattening of both apices, especially the right. On palpation, respiratory expansion was deficient on both sides, especially on the right. Owing to his aphonia, the vocal fremitus could not be tested. Percussion revealed on the right side, dulness down to the third rib in front, and to the inter-scapular region behind, on the left side slight dulness at the apex in front and behind.

On auscultation we found, over the right upper lobe, and specially in the second interspace, prolonged expiration, cavernous breathing, and coarse, consonating crepitation ; whilst behind, prolonged expiration and bronchial breathing could be made out, extending low down in the interscapular region. At the left apex, before and behind, the expiration was prolonged, and the character bronchial, with a few smaller crepitations, Owing to the aphonia, the vocal resonance could not be tested. but whispering pectoriloquy could be made out in the second right interspace in front.

Laryngoscopic Examination.—Some ulceration of both cords with greatly diminished movement, also considerable swelling of both false cords.

His other systems are all practically normal.

In this patient then we have to conclude that, at least since February last, the nutritive power of his lungs has been so much below par that the tubercle organism has been able to live and reproduce itself in them. Further, that as the result of the lowered nutritive power, plus tubercle, the disease has in both lungs been making rapid progress, and has also, since May last, broken out in him, as it often does, in the larynx.

Here, now, several questions might offer themselves for answer.

(1) Where did the tubercle bacilli which set up his lung mischief come from? Was it from some old tubercle, locked up and harmless for years in the tissues about the hip-joint, or glands connected with those, or has it been from fresh bacilli inspired or ingested?

(2) Was it the influenzal catarrh of the smaller bronchi in February last (1900) which, like the last straw, lowered the nutrition of the part, and so let the tubercle get root, or has the tubercle organism been there from March 1899, or for months or years previously to that, setting up no symptoms because kept quiescent by the higher state of general nutrition?

(3) How long can the tubercle organisms remain latent in the tissues? *e.g.* have the tubercle bacilli which caused the hip-joint disease in this patient been latent for all those years and still capable of mischief, or have they been killed off long ago and rendered incapable of doing further harm?

All those questions are interesting, and specially so at the present time, when so much is being spoken and written on the subject of the tubercular organism, and its special potency for harm. Let us therefore say a little as regards this organism and how it works.

As you all know, the tubercle bacillus is an infective organism. Long before Koch's discovery of the bacillus, Villemin and others had pointed out its powers of infection—animals had been observed to become tubercular as the result of the ingestion of tubercular material, or as the result of the inhalation of the air containing particles of tubercular matter. Since Koch's discovery of the bacillus, experiment on animals has more decisively demonstrated its infective nature.

But now comes a most important question:—Are we to conclude that the main factor in the production of tubercular disease is the bacillus, and are our efforts for the amelioration of phthisis to be expended as our efforts are against plague or smallpox, viz., isolation and efforts to destroy the tubercle bacillus?

Or, on the other hand are we to conclude that whilst the bacillus of tubercle is infective, it is only capable of taking root in those individuals with greatly lowered nutritive power—either congenital or acquired, that its potency and powers for harm, as an infective organism are such as can be counteracted by ordinary cleanliness as regards person, and general precautions such as are required for other diseases, as regards food.

To put it tritely—in the disease tubercular phthisis, is the soil or the germ the main factor—is tubercular phthisis a disease which resembles smallpox, scarlatina, measles, or is it a disease

which resembles rheumatism, diabetes, or insanity? Doctors differ, but I unhesitatingly lend myself to the latter view.

To get information on this point, let us look for a little into the etiology of phthisis. Much could be said about this, but in a clinical lecture we can only consider the more outstanding features.

1. *Age.*—Pulmonary tubercle is the tubercle of adult life, its age of maximum frequency being about 30 or 35. Observe here that we probably meet with cases of phthisis more frequently at an earlier age than this, but it is to be remembered that this is because a much greater number of people are living at 20, than at 30 or 35. Taking the number of cases of phthisis in proportion to the number of people living at different ages, the maximum frequency will be found, as I have said, at about 30 or 35. Now why is this? To obtain light on this point, we have to remember that tubercle affects other organs, notably the intestine and the brain, and that whilst the period of maximum frequency of intestinal tubercle is boyhood or girlhood, the period of maximum frequency of brain tubercle is early childhood. Can we from this deduce any law explanatory of the incidence of tubercle in those different organs? We have not here time to discuss this subject fully, but the answer is that it is because the potency of the tubercular organism is so dependent on the nutritive power of the tissues that the organism gets root, mainly at the times when the maximum nutritive power required for growth is becoming, or has become exhausted. Maximum brain growth being completed about the third year, maximum intestinal growth being completed about the eighth or tenth year, and lung growth being completed about the twenty-first year, brain tubercle is the tubercle of childhood, intestinal tubercle that of boyhood or girlhood, and lung tubercle that of adult life. All this, as we have seen, points to the importance of the soil.

2. *Conditions of life.*—Pulmonary phthisis tends to show itself when the conditions of life are such as to bring men together, and to keep them doing sedentary indoor work. That is to say, pulmonary phthisis tends to show itself when air is impure, and sunlight is kept out, and where the lungs, and the muscles generally, are not sufficiently exercised. The

occupations specially prone to phthisis are printers, clerks, factory hands, engravers, watchmakers, etc., in all of which occupations confined, often gas-lighted air is usual, and in which there is little or no exercise of lung. On the other hand, pulmonary phthisis is little known in localities where the population is sparse, and where the weather permits of vigorous, open-air life. Pulmonary phthisis I have long ago regarded as one of the sacrifices which humanity must pay for an advancing civilization, for of course for civilization, men must be brought together in large numbers in towns, must do relatively little physical work, must have disused lungs and must have little fresh air and sunlight. The practical point to be remembered here is that in our treatment of phthisis we must, as it were, put our patient back in civilization, we must put him into a locality where he can be in the open air for the greater part of the twenty-four hours, and where he can get plenty of sunlight, sufficiency of exercise, etc. As regards the patient whom we have just seen, we can understand that it was a pity that he should have come to a big town; had he remained in the country, his chances would certainly have been better.

3. *Heredity.*—In connection with the subject of heredity a good deal has been said lately to diminish its importance in connection with phthisis. This I believe is largely because the statistical data on this subject have not been properly interpreted. No physician ever imagines that the tubercle organism is transmitted, but all physicians recognize that what is transmitted is the weakened nutritive power which permits of the tubercle to get root. Probably the best way to regard this subject is to bear in mind Jaccond's classifications into phthisis as hereditary and phthisis as innate. In hereditary phthisis there will be of course a heredity of phthisis, in innate phthisis there will be a heredity of such conditions as diabetes, epilepsy, insanity, etc., and it will be no surprise, and certainly no argument against the importance of heredity, if we find in our investigations that innateness seems often to be as important, if not more so, than direct heredity. As said before, what is inherited is not the phthisis, but the lowered nutritive power which permits it to come about.

Bearing this in mind, we can further readily understand that phthisis may frequently show itself even when the heredity

appears fairly good. But this is I believe largely because the information which we get as evidence is not, and can rarely indeed be sufficient. There are few families that have not some weak spots about them, and apart from illnesses which have manifestly shortened life, we have to remember that parents may have been too young or too old, or have suffered from temporary illnesses or periods of vital prostration, and in this way have transmitted to one or other of their descendants a constitution much less robust than that which they had themselves received. Here be it mentioned that there are of course some who deny the "transmission of acquired characteristics." Fortunately however for humanity, among the common-sense public, and among practising physicians, these have not found many disciples.

In connection with heredity and with the relative importance of what may be called soil and germ in this disease, the following table may be of interest.

SMALLPOX	SYPHILIS	INSANITY	PHTHISIS
1. Transmission is from mother only.	1. Transmission is from either parent.	1. Transmission is from either parent.	1. Transmission is from either parent.
2. Disease in offspring follows closely upon disease in the mother.	2. Disease in the offspring follows, in all cases, the disease in the parent.	2. Disease does not in all cases follow — it often precedes—the development of the disease in the parent.	2. The disease may appear in the child before it is developed in the parent, and the effect of its inheritance is certainly manifest in the early death of the child from the diseases of childhood.
3. The transmitted disease is protective.	3. The inherited disease is protective.	3. The inherited disease is not only non-protective but predisposing.	3. The inherited disease is not only non-protecting but predisposing.
4. Atavism is impossible.	4. The conditions of Atavism are not known.	4. The disease may be transmitted by the parent without development.	4. The disease may be transmitted by the parent without development.
		5. Atavism is a frequent and important characteristic.	5. Atavism is a frequent and important characteristic.

A glance at the above table shows that from the point of heredity, phthisis resembles insanity as distinctly as it differs from the other two. It is certainly also the case that in

family histories, phthisis and nervous diseases generally run very closely together, and that in many respects the phthisical and neurotic resemble one another, alike in physical conformation and in mental characteristics.

To discuss the symptoms, physical signs, diagnosis, and prognosis of phthisis in detail would be out of place at this time. I shall therefore consider these only in so far as they bear on the various methods of treatment. First of all, then, as regards the symptoms.

In all cases of consumption, we endeavour to elicit evidence indicating that before the disease had decidedly manifested itself, there had been a period of ill health of one kind or other. In our patient, with his bad heredity and old hip-joint disease, there had been the first influenzal attack; and though he seemed to have recovered from this, there is little doubt that his second attack—from which he himself dates his illness—found him weaker than he had been previously, and so enabled the tubercle to grow and increase. In most cases evidence of preceding lowered health is as marked, if not more so, than in this case. It may be that the patient has simply felt "down" and "fagged," or that he has been losing weight, or suffering from indigestion or breathlessness on exertion, in a way which he used not to be; or it may be that he has had an illness like influenza, or typhoid fever, or some injury or accident from which he feels he has not completely recovered strength. The oft-mentioned statement of the French physician Beau, that phthisis is a disease which does not begin, but which finishes, is unfortunately too often absolutely true to life.

The cough of phthisis presents two aspects for consideration, a salutary, and an injurious one. In the first it is of use in getting rid of caseous softened tubercular foci—the formation of a cavity being often the first stage in the healing of a phthisis. In the second aspect it is harmful owing to the pent up air distending or tearing open empty or half-empty cavities and caseous foci, or rupturing blood-vessels, or by conveying tubercular particles from diseased to sound areas of lung. These two aspects must be borne in mind in connection with the treatment of the cough.

When the larynx is affected, as it is in our patient, the cough tends to be much aggravated. This is due in part to the

special irritability of the larynx, causing cough to occur much more frequently than the amount of secretion, etc., to be coughed up requires. But in part also the specially irritating cough in laryngeal phthisis is to be ascribed to the fact that the disturbance of the laryngeal mechanism renders the act of coughing less perfect and less fit to secure its end. Thus if we observe our patient when he is coughing, we notice that the cough occurs in severe paroxysms, and that it has a peculiarly hissing character, as if the air in the lungs could not be pent up and held until, with its expiratory rush, it could efficiently expel the secretion. The result is that cough effort after effort is required before the spit can be brought up. The spit is muco-purulent and abundant, shows bacilli and lung tissue, and has been once or twice slightly streaked with blood. This has been the result of capillary oozing only; our patient has had no big bursts, as from a tubercular erosion of a blood-vessel, or the rupture of a miliary aneurism of a cavity. Many cases like this with laryngeal and other tubercular complications, and a rather rapid course, notice no hemoptysis from beginning to end.

Dyspnœa is not complained of by our patient, so long as he remains quiet. This is because the amount of air required for quiet breathing is such a small fraction of the total respiratory capacity, that even although there be extensive disease of both lungs, with some slight fever superadded, air hunger is not manifest to himself. His respirations, however, are slightly quickened, and we have to bear in mind that with his laryngeal mischief, œdema may at any time occur and cause a dyspnœa which may necessitate tracheotomy.

Next it will be remembered that in 1899 our patient described himself as having had a pleuritic attack; this gives me now the opportunity to discuss briefly the relationship between pleurisy and phthisis. Here it is in the first place noteworthy that of all diseases pleurisy is the one which most frequently, at longer or shorter intervals, precedes phthisis, and that in pleuritic attacks, and in bilateral pleurisy, we may be almost certain that a tubercular element is present. Secondly, it is to be remembered that pleurisy presents also a salutary aspect in its relation to phthisis. The slight pleurisies which from time to time occur over a diseased lung apex produce

there thickenings and adhesions, which at one and the same time guard against the occurrence of a pneumo-thorax, and aid the shrinking and cicatrisation of the affected piece of lung. Moreover, even the pleurisy of the lower lobe which frequently supervenes, though it may cause pain, aggravate the cough, and induce general disturbance and fever, may be salutary in the effusion stage. There is no doubt that by allowing the lung to collapse, it may aid in the healing up of a cavity. It is important to remember this in connection with the treatment of pleuritic effusion affecting a phthisical lung. I know of one case in which a pneumo-thorax, and another in which a fatal hæmorrhage, followed aspiration in such a condition. When, however, in a phthisical pleurisy the effusion is purulent instead of serofibrinous, our course is clear, for incision and drainage gets quit of the pus, and yet leaves the collapsed lung to expand slowly. I have seen several phthisical cases show manifest improvement after an empyema and its treatment in this manner.

Lastly, in connection with the symptomatology of phthisis, the subject of the general nutrition requires reference. In the phthisical, the appetite, and the digestive and assimilative powers tend much to be below par, and especially is this the case with the assimilative. The laity will often observe that the phthisical, like the diabetic, resemble the lean kine of Pharaoh's dream.

The leanness may be extreme. In a case which runs its course to the very end, it may amount to a loss of not much less than half of the healthy body weight of the individual. This is practically the same as in fatal starvation, and it indicates that in phthisis the termination is due, not so much to anything of the nature of a toxin, as simply to lack of fuel. We can picture, I believe, no more instructive object lesson than that which we often witness at the *post-mortem* examination of a phthisical case which has thus run its course towards the end. Moreover, when, within the emaciated cadaver, reduced to the extreme degree of attenuation, we find as we often do a liver huge in size and great in weight, from fatty or waxy change, a very storehouse of combustible material, we realise that death has occurred, not alone because the life-giving tissues, the nervous and the muscular, have given up all they can give, but

because they themselves have lost the power of living. The lamp of life has, as it were, gone out, although it has that within it which might have kept it burning for months.

Regarding the physical signs of phthisis from the point of view of the treatment, we shall consider these mainly as they are likely to show themselves at the very early stage of the disease, as it is then that treatment is really of most importance. This subject, however, requires some detail.

We have already seen, in considering its etiology, that phthisis is apt to supervene in those individuals in whom the lungs are not sufficiently used ; it follows therefore as a corollary, that we should expect the phthisical process to begin at the least used parts of the lung. Which then are the least used parts of the lung?

Supposing in the living animal two pleural windows be made, *i.e.* two openings in the chest wall, down to, and exposing, the costal pleura, one at the upper, and the other at the lower part of the chest. Through the transparent costal pleura the gliding to and fro of the underlying lung in inspiration and expiration can then readily been seen. A glance will reveal that this gliding movement takes place to a very slight extent at the upper opening, as compared with the lower, and observations made in this way will show that from the back part of the apex and upper posterior border of the lung, as fixed points, the amount of movement increases progressively downwards, forwards, and outwards. Thus, supposing A, Fig. 1, represent a lung in expiration looked at laterally, B will represent the amount of inspiratory enlargement, and the lines *e*, *d*, and *c* will represent progressively the parts least used. It would follow then that the phthisical process tends to begin at the part enclosed by the line *c*, and to spread thence to *d*, *e*, and so on. In this way it can be understood that beginning at the posterior apex the phthisical process in its extension tends to involve the upper portion of the lower lobe behind before it has involved the bulk of the upper lobe in front. From this it

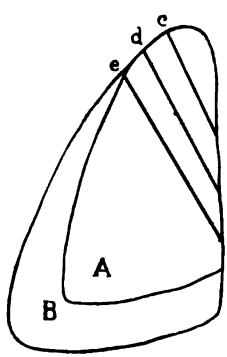

Fig. 1.

is evident that the parts of the chest to which most attention has to be paid in the early stages of phthisis are the supraspinous regions, and the upper interscapular areas. The plan which I am in the habit of following is to begin by marking out by percussion the upper margins of the two apices (Fig. 2), and then marking out and percussing corresponding points, a a^1, b b^1, c c^1, d d^1, on the two sides. In this way it will be discovered (1) if there is any shrinking at an apex, and (2) if there is any difference in the percussion notes. But, further, in connection with the percussion notes, we have to remember that a slight amount of tubercular deposit, or slight catarrhal pneumonia, though it ordinarily causes a heightening of the pitch, may at times cause a slight tympanitic resonance. In this way it may be that the affected apex may on occasions appear as regards percussion to be rather the more resonant one.

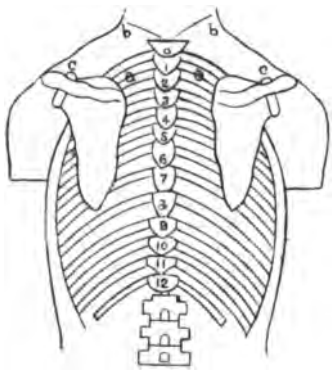

Fig. 2.

Next, in auscultation, we carefully compare the apices at the same corresponding points, and for indications of disease, we look for (*a*) harshening of the inspiration, with prolongation of the expiration, (*b*) for jerky or wavy inspiration, with prolongation of the expiration, or (*c*) for weakening of the respiratory murmur. We have to remember that all these variations in the breath sounds can be brought about by varying degrees of the same condition, viz. catarrh of the smaller bronchi.

Next, by getting the patient to take long breaths or to cough, crepitation is to be looked for, especially at the end of inspiration, and we then test the voice and cough resonance, the cough resonance being in many cases the one which shows the more marked change. Having done this, we next proceed to examine every other part of the chest in a somewhat similar manner, always comparing the corresponding points on the two sides. We must not omit to do this, for although in a

great majority of instances, evidence of disease is found earliest at the parts referred to, yet cases again and again occur where the disease will be found elsewhere. Practically speaking, therefore, we should explore every square inch of the surface of the chest wall.

(*To be continued.*)

CASE OF HYPERTROPHIC OSTEOPATHY OF HANDS AND FOOT FOLLOWING AMPUTATION AT THE HIP JOINT FOR SARCOMA

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THE following is a good example of this very rare condition, of which a few cases have been recorded as the apparent result of pulmonary disease accompanied by impeded respiration.

R. I., aged 19, was admitted to my wards in the Edinburgh Royal Infirmary in October 1898, suffering from a periosteal sarcoma affecting the lower end of the right femur. Amputation was performed a little above the middle of the femur about five inches above any visible sign of disease.

Healing took place by the first intention, and he was discharged in three weeks with a firmly healed stump.

Nothing was heard of him for twelve months; he then returned with a small sarcomatous mass at the lower end of the stump. Disarticulation at the hip joint with anterior and posterior flaps was accordingly carried out, and from this operation he made rapid recovery. During convalescence, however, some three weeks after the operation, there occurred a rise of the evening temperature to 102° F. or thereabouts. As there was no reason for this to be found in the stump, his lungs were carefully examined, when it was noted that there was a diminution of the breath sounds at the base of his right lung, followed in a few days by dullness on percussion. In the course of a fortnight the lower third of the right lung was absolutely dull, and there was evidence of effusion of fluid at both bases.

Coincidently with these events it was observed that his hands and foot were becoming enlarged, and this condition

progressed for some two months, thereafter remaining stationary till the date of his death. The hypertrophy affected the bones and soft parts in a way very suggestive of the appearance of acromegaly; but though the enlargement spread up the bones of the forearm, and to a slighter extent those of the leg, there was no change perceptible in the bones of the face or other parts. The patient complained of severe aching pain in the shoulders and elbows, for the relief of which local and general anodynes were found necessary in order to procure sleep.

The hands were usually moist and hot; sensation was not impaired, and the reflexes were apparently normal. Some loss of power and stiffness in the hands was noted. The growth of hair in the affected parts was not affected, nor was there any optic atrophy, thyroid changes, nor other symptoms such as are occasionally found in cases of acromegaly.

A radiograph of the hands showed very clearly the formation of new bone along the shafts of the metacarpal bones and phalanges, but the joint surfaces were not involved, and the lesion appeared to be entirely extra-articular. The lung trouble, which was evidently due to secondary sarcomatous infiltration, steadily increased, and he died a few weeks ago, just two years after the first operation.

CLEIDOTOMY: AN OPERATION ACCESSORY TO CRANIOTOMY OR BASILYSIS

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(Read before the Edinburgh Obstetrical Society, November 14, 1900)

ABSTRACT.

Cleidotomy: division of the clavicle; Schlüsselbeinschnitt.

Notes of case of labour in contracted pelvis, c.v. 7 cms; basilysis; impaction of shoulders at brim; unilateral cleidotomy; immediate delivery.

Recommendation by Dr H. R. Spencer in 1895; cases of cleidotomy reported by Phänomenoff, Knorr, Strassmann, v. Herff, Guérard, Kallinowsky, and Bonnaire.

PLATE I.—MR COTTERILL'S CASE OF HYPERTROPHIC OSTEOPATHY FOLLOWING AMPUTATION.

Allied operations of cleidotripsy, cleidorrhexis, and supra-acromiotomy.

Description of operation.

Indications :—

(1) Broad-shouldered fœtus.
  (*a*) Normal-sized head; (*b*) large head; (*c*) deformed head (anencephalus).
(2) Contracted pelvis.
  (*a*) Justo-minor; (*b*) flat-rachitic; (*c*) kyphotic.
(3) Broad-shouldered fœtus in contracted pelvis, neither excessive.
(4) Impacted shoulders in breech case.
(5) Danger from eclampsia, threatened uterine rupture, etc., necessitating rapid delivery.

In all (or nearly all) its indications cleidotomy is accessory to craniotomy or basilysis, and is carried out upon the dead infant; but these are not essential restrictions.

Advantages over ordinary embryulcia of the shoulders and evisceration of the thorax.

Cleidotomy is not so much an operation by itself (although it is possible to imagine circumstances in which it might be performed independently of all other operations), as an operative manœuvre accessory to such procedures as craniotomy and basilysis. It is not likely that it will be very often indicated in these times when the current of obstetric opinion and practice is setting strongly against the operations which are destructive to the infant; but it is certain that now and again cases will arise in which it is difficult to imagine any other procedure which would meet their requirements. I have only used it in one case, to be now narrated, but in that case it was of immense assistance.

On August 6 of the present year (1900), I was sent for by Dr James Smith to a difficult confinement case. The patient was a primipara, twenty-five years of age, at the full term of pregnancy, and had been in labour since the small hours of the morning; it was now twelve noon. As a child she had suffered much from rickets, and had many signs of that disease, including evidently bent legs. About two hours before I was sent for the os had attained full dilatation (the membranes had

ruptured early), and Dr Smith had with some difficulty applied forceps, but after repeated tractions had been quite unsuccessful in altering the level at which the fœtal head was lying, viz., above the inlet. I found that the conjugata vera measured three inches, or a little less (about 7 cms), and that the head was lying at the brim in the transverse diameter, with the occiput to the left. It did not seem to me that the head was either very large or very well ossified. The sides of the pelvic brim and also the cavity and outlet felt narrow, and probably the pelvis was to some extent generally contracted, as well as flat. The infant was dead. I put on the forceps with some difficulty, getting an antero-posterior grasp of the head, but one or two attempts at traction showed that nothing was to be expected from that method of interference. Without further delay, and with the forceps still applied to the head, I perforated the cranial vault with Simpson's basilyst, washed out the cranial contents and vagina with an antiseptic solution, and again tried to extract the child, first with the forceps and then with a Simpson cranioclast. It was, however, immediately necessary to break up the basis cranii, which I did with the basilyst, and thereafter I was able to bring the head on to the perineum and partly through the vulva. At this point I was again baffled, for no further progress could be obtained. I tried in vain to get first my finger and then a blunt hook into either the left or right axilla of the infant. The occiput was to the front of the mother and the right shoulder in the right side of the pelvic inlet; the patient was lying on her left side. I noticed in one of my many unsuccessful attempts to reach the axilla, that when I passed my finger up to the right side of the mother's pelvis I could feel the child's right clavicle quite distinctly; it struck me that if I could divide that bone the shoulders might diminish in their transverse diameter and then enter the pelvic inlet. I made the suggestion to Dr Smith, who agreed with me; and with a pair of long, strong scissors, which he happened to have with him, I cut through the right clavicle about the point of union of the inner third with the outer two-thirds. Almost immediately after this I found that I could now reach the infant's left axilla lying to the left side of the mother's pelvis. I passed the blunt hook into it and without any great difficulty ex-

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tracted the shoulders. The rest of the confinement did not cause any trouble, although even the child's hips required some firm traction to bring them through the brim. The placenta came away easily, and the perineum needed two stitches. The fœtus, a female, was of medium size, probably weighing about seven pounds; and the basilyst had done its work well both as regards vault and base. The right clavicle had been cleanly divided in the position above mentioned. A comparison of the two shoulders showed at once that the right one (with the divided clavicle) could be folded together in a much more marked way than the left, the total transverse diameter of the shoulders could thus be considerably diminished. Doubtless the diminution would have been more marked had I divided also the left clavicle, which I was quite prepared to do had circumstances appeared to call for it. It need only be added that the mother made a capital recovery, and has been advised if she again find herself pregnant to consult her doctor before the seventh month of utero-gestation. Unfortunately, measurements of the infant, and especially of the shoulders, were not made at the time of the cleidotomy, and an opportunity of making them did not recur; but I should judge that the diminution in the bisacromial diameter by the unilateral cleidotomy would be about half an inch.

Doubtless obstetricians in past times, when in the presence of such an emergency as the impaction of the shoulders after the birth of the head (either intact or craniotomised), pursued some plan of procedure for the reduction of the width of the shoulders such as has been described. They do not seem, however, to have specialised the procedure into a definite operation nor to have localised the embryulcia to the clavicles. In these respects the contribution of Dr H. R. Spencer marks a new departure. Writing in the *British Medical Journal* for April 13, 1895 (p. 808), under the title "On Delivery in certain cases of Impaction of the Trunk of the Fœtus," he says: "It may be necessary to reduce the width of the child's shoulders. With this object I have found it a useful plan to snip through the clavicles with scissors, then if necessary to pass a blunt hook into the axilla, and then to bring down the arms." He also states that he had met with several cases where craniotomy

alone was not sufficient to extract; presumably, therefore, he practised this snipping through of the clavicles on several occasions. (In a letter to me from Dr Spencer, received November 12, 1900, it is stated that he has up to the present time performed the operation in "about five or six cases, it is not often required but is very useful.") About six weeks later (June 1, 1895) appeared a contribution from the pen of Prof. N. N. Phänomenoff of Kasan (Russia), entitled, "Zur Frage über Embryotomie. Über die Durchschneidung des Schlüsselbeins (Cleidotomia)." This was in the *Centralblatt für Gynäkologie*, xix. 585, 1 Juni 1895. The circumstances which led Phänomenoff to perform the operation of division of the clavicle ("Durchschneidung des Schlüsselbeins") were, briefly stated, disproportion between the fœtus and the pelvic canals due rather to great size of the former than to marked contraction of the latter, and more particularly to great size affecting specially the shoulders. The case, which he records in detail, was one in which the diagonal conjugate measured 11 cms., and the conjugata vera presumably just under 10 cms. (under four inches). The patient had had three previous confinements which had all been very markedly delayed (four days, two days) and had been terminated by forceps. In the present confinement (the fourth) the head was without much difficulty brought down with forceps on to the perineum, but then further progress stopped and in the midst of a series of extractive procedures, none of which was successful, the fœtus died. Suspecting that he had to do with a case of great breadth of the fœtal shoulders Phänomenoff passed a pair of strong scissors up above the brim of the pelvis, and cut through with some short snips ("durchschneidet mit einigen kurzen Schnitten") both clavicles near their inner end. Strong traction on the head now was sufficient to bring one of the axillæ within reach, and Braun's hook fixed therein completed the delivery of the body. The infant weighed thirteen pounds, or 5300 grms., and had a length of 61 cms.; the circumference of the shoulders was 41 cms. Phänomenoff adds that some years previously he had performed the same operation for a similar state of affairs. He strongly recommends the use of the name "cleidotomia."

On November 22, 1895, Knorr showed to the Berlin

Obstetrical Society an infant upon whom both craniotomy and cleidotomy had been performed (*Ztschr. f. Geburt. u. Gynäk.*, xxxiv. 105, 1896). The case was one of labour in a forty-four year old parturient; she had been in charge of a midwife and the uterus had evidently ruptured spontaneously before help was sent for to the Poliklinik. The patient was moribund, there having been much intraperitoneal hæmorrhage; the infant was presenting R.O.A.; without an anæsthetic craniotomy was performed and the head without difficulty brought down with the cranioclast. Powerful traction for several minutes failed to deliver the trunk. The child's sternum was lying opposite the promontory of the sacrum, so with Siebold's scissors both clavicles were divided without difficulty. The result was most astonishing ("der Effect war sehr eclatant")—a slight pull delivered the trunk. The patient died twenty minutes later. The infant was very large, measuring 57 cms. in length and weighing, without the brain, 4110 grms., and this fact along with the degree of pendulous abdomen which was present had no doubt something to do with the rupture of the uterus. The infant, it may be added, showed rigor mortis, which lasted twelve hours.

In the Autumn of 1896, Strassmann (*Arch. f. Gynæk.*, liii. 135, 1897) published three cases of cleidotomy, or as he prefers to call it, "Schlüsselbeinschnitt." In two of these only one clavicle was divided, but in the third the operation had to be performed on both sides. In the first case there was threatened uterine rupture on account of disproportion between the fœtus and the maternal pelvis, and the vagina showed contraction in consequence of a previous operation for vesico-vaginal fistula. The fœtal head was perforated and easily brought down with the cranioclast, but the shoulders could not be extracted till the left (posterior) clavicle had been divided, then the delivery was easy. The child weighed 3700 grms., and measured 54 cms. in length. The circumference of the shoulders was 41 cms. The second case was one of a first labour in a generally contracted pelvis (woman's age, 32) with a conjugata vera of 9 cms. The child was already dead. The head was perforated, and after two attempts with the cranioclast and strong abdominal pressure was brought to the vulva: but the shoulders could not be extracted till the right

clavicle had been divided. The infant was large (exact weight not ascertained) and in a macerated condition. The third case was that of a forty-year old xiii-para who had been five times artificially delivered. In the present labour uterine rupture was threatened, the head was presenting and fixed at the brim, and the child was apparently dead. Version was not possible, so the head was perforated and brought down; but the shoulders remained high up and the arms could not be brought down for fear of rupturing the uterus, so bilateral cleidotomy was performed. Thereafter the birth was easily completed. The child, a male, was large (weight 4200 grms., circumference of shoulders 41 cms.). On the left side the subclavian vessels were intact; on the right the vein was cut.

In the same journal (*Arch. f. Gynæk.*, liii. 542, 1897) in which Strassmann's article appeared, Prof. v. Herff described a somewhat similar procedure which he called "Zertrümmerung des Schulterngürtels" (destruction of the shoulder-girdle), and indeed regarded as synonymous with cleidotomy. He recorded a case operated upon in 1889: the infant was anencephalic and the head had been extracted by forceps but the broad shoulders could not be made to engage, so with Levret's scissor-like perforator the upper pair of ribs along with one clavicle were broken up. The further delivery caused no trouble. In another case treated in 1896, in which the pelvis was flat-rachitic (c.v., 9 cms.), the head of the infant was easily brought down with forceps and abdominal pressure, but the shoulders became impacted; the posterior shoulder was treated in the same way (with the perforator) as in the case of the anencephalic, and then with the help of Guyon's hook the labour was quickly completed. The infant died during the confinement; it weighed 4000 grms., had a shoulder circumference of 40 cms. (head circumference 34 cms.), and a length of 52 cms. It is to be noted that v. Herff's procedure is, as Bonnaire maintains, rather a *cleidotripsy* than a *cleidotomy*, but the principle is the same, and the indications are not different.

A case reported by H. A. v. Guérard (*Centrlbl. f. Gynäk.*, xxii. 71, 1898) supplies still another indication for cleidotomy. It was that of a full-term labour in a kyphotic pelvis with a greatly contracted outlet and ankylosed sacroiliac joints.

The head was broken up and extracted with the cranioclast, and then after cleidotomy had been performed and the coccyx had fractured, the whole child was born. The distance between the tubera ischii was only 5·2 cms. In the same year (1898) G. Kallinowsky of Thorn published an *inaugural dissertation* of Berlin "Über Kleidotomie." Of this work I have seen only the abstract in the *Centralblatt für Gynäkologie* (xxii. 1011, 1898), and do not know whether any new case is described in it, unless that referred to as by Wolff is such.

In March of the present year (1900) E. Bonnaire's article, "De la réduction du volume des épaules dans l'accouchement dystocique," appeared (*Presse médicale*, No. 21, p. 125, 14 Mars 1900). In it he described various forms of dystocia connected with the birth of the shoulders, referring to several procedures commonly employed in order to overcome the difficulty, such as bringing the bisacromial diameter into the long diameter at brim or outlet, bringing down the posterior arm below the promontory of the sacrum (Jacquemier's manœuvre), bruising or breaking the shoulder girdle (*kleidorrhexis*) of set purpose, as carried out by A. Müller (*Monatsschr. f. Geburtsh. u. Gynæk.*, viii. 477, 1898), etc., and then passed to the consideration of cleidotomy in particular. He gave details of two cases in which this operation was practised by him. In one there was a justo-minor pelvis (c.d. = 11 cms.) with rigidity of the soft parts in a primipara; the labour was long; unsuccessful attempts to deliver with forceps were made; the infant died; basiotripsy was then performed; and finally in order to extract the trunk bilateral cleidotomy was carried out with sharp scissors. In the second case there was also a justo-minor pelvis (c.d. = 9 cms.) in a primipara; premature labour was induced with Tarnier's dilator and an intra-cervical glycerine plug; dilatation, however, was incomplete and had to be supplemented manually; the infant died, and then the head was perforated, the cranioclast applied, both clavicles divided, and the child at length delivered. From five experiments upon dead-born infants Bonnaire found that cleidotomy diminished the bisacromial circumference by from 1 to 3 cms. in the unilateral, and from 3 to 4 cms. in the bilateral operation. Bonnaire also described an operative procedure which he had adopted when it was impossible to reach the clavicles to divide

them. This he called *supra-acromiotomy*, and pointed out that it was a localised embryotomy in which the skin and muscles covering the projection of the shoulder were divided widely and deeply. He reported two cases in which supra-acromiotomy had been performed: one as an accessory to basiotripsy upon a dead infant in a justo-minor pelvis with a c.v. of 8½ cms.; the other as an accessory to cranioclasm upon a dead infant in a case of eclampsia where forced delivery had been necessary. In both these instances cleidotomy was attempted, but found impossible of performance; in the latter case the patient died, a result for which the eclampsia was no doubt to blame.

Let us now gather together some conclusions from the records which have thus far been accumulated referring to cleidotomy and the allied procedures of cleidotripsy, cleidorrhexis, and supra-acromiotomy. *Cleidotripsy* may be dismissed at once, for manifestly to break up the clavicle with a perforator cannot be either so elegant or so satisfactory an operation as to divide it with a pair of scissors. *Cleidorrhexis* also cannot be recommended, as in it the force is applied to the shoulders (it is used in breech cases when the most of the trunk has been born) in a way difficult to regulate and uncertain in its action. *Supra-acromiotomy* is only to be employed when cleidotomy is impossible on account of inaccessibility of the clavicles; it is not so exact or useful, although it may be of great value in a limited number of grave cases such as eclampsias. Practically, therefore, cleidotomy stands out as the best operation for comminuting the shoulders and diminishing the bisacromial circumference.

It is an operation not difficult of performance. The only instrument needed is a pair of long, strong, straight scissors. The index and middle fingers of the left hand are passed up along the anterior aspect of the infant (whose head or breech has already been born) until the prominent ridge of the clavicle of one side is felt, and it can be felt very easily; then the scissors held in the right hand is pushed up under cover of the two fingers of the left hand until it touch the clavicle at a point about its middle or near its sternal end; the blades are then slightly separated and the bone with the skin covering it is snipped through and the scissors withdrawn, or the operation repeated upon the other clavicle if need be; the two parts of the clavicle will be felt to over-ride at once if the section has

been complete. There is really no danger of wounding the mother's parts, and results have shown that even the subclavian vessels, and especially the vein, of the infant need not be injured if reasonable care be taken. A dead infant, I found, had a bisacromial circumference of 27 cms., with the shoulders compacted on the chest 25 cms., with one clavicle divided 23 cms., and with both clavicles divided 22 cms. These measurements show a diminution of the bisacromial circumference of 2 and 3 cms. in unilateral and bilateral cleidotomy respectively.

As to the *indications* for the operation, obstetrical opinion can hardly be said to have crystallised. Cleidotomy has not yet, I believe, been performed upon the living infant. In the recorded cases the child was dead, therefore out of court, so to say, but not, unfortunately for the mother, out of the uterus! There seems, however, no real reason why under certain rarely occurring circumstances cleidotomy should not be performed upon the living fœtus. Fractures of the clavicle are met with as a result of labour or of obstetric interferences, and with care these heal quickly and thoroughly; in cleidotomy the same thing may quite well be expected to happen if the skin wound be kept aseptic. The great indication, of course, is disproportion between the size of the shoulders and the pelvic canals. There may be, therefore, (1) the broad-shouldered fœtus with (*a*) a normal sized head, (*b*) a large head, and (*c*) a deformed head, as seen typically in the anencephalic; in the first and third of these cases cleidotomy may be the only operation, in the second it will be accessory to craniotomy or basilysis. Some years ago I showed to this Society (*Trans.*, xviii. 225, 1893) a large still-born fœtus with a bisacromial circumference of 43·5 cms.; in this case I believe the operation would have been justifiable either before or after the infant's death. In the case of the anencephalic infant the indication is absolutely clear, for the small head is usually born as far as the vulva easily, while the broad shoulders give much trouble in passing through canals imperfectly dilated by the head. There may be (2) the normal sized fœtus in the contracted pelvis, specially in (*a*) the justo-minor, but also in (*b*) the flat and sometimes in (*c*) the kyphotic. In the first and second cases the cleidotomy will be needed at the brim in most instances,

while in the third it will most probably be required at the outlet; and in all the three it will doubtless be preceded by craniotomy or basilysis. There may be (3) the fairly broad-shouldered fœtus in the moderately contracted pelvis. In this group of cases cleidotomy would not be needed either for the fœtal condition alone or for the maternal alone, but for the difficulty which arises from the combination of both in the one case. In all these indications it has been supposed that the infant has presented by the head; but (4) it may present by the breech and then cleidotomy may in some few cases be also advisable, although the necessity is not so great or the good effect so obvious. Finally (5) there may be cases in which although there may be no special disproportion between the shoulders of the infant and the mother's canals, hard or soft, yet on account of pressing danger from eclampsia, threatened uterine rupture, etc., it is essential that the labour be rapidly completed. Here also the cleidotomy will probably follow a craniotomy or a basilysis.

Cleidotomy, then, must take its place among the legitimate obstetric operations; legitimate, at any rate, when the fœtus is dead, possibly permissible even when it is alive if it can be shown not to endanger seriously its chances of living. If it be asked what obstetric procedure it displaces, the answer is that it takes the place of indiscriminate and unregulated embryulcia of the shoulders and thorax. It is simpler, more rapid, much more elegant, and equally if not more effective. The cause of delay is the width of the shoulders in the bisacromial diameter; by cleidotomy this diameter is immediately diminished. So the end is achieved in the quickest and most straightforward and therefore (theoretically, at least) the best way.

DOUCHE MASSAGE

By CHARLES BEGG, M.B., C.M.,
Bath

DURING a tour this summer round various of the Continental Spas nothing impressed me so strongly as the douche massage as carried out at Aix-les-Bains.

In considering how far *a treatment* fulfils our expectations, it is necessary first of all to clearly define our aims.

In douche massage I consider our aims are twofold—first, elimination, and second, what I would call tonic stimulation of the nervous system. Dr Whitby[1] speaks of the second aim as "organic or molecular exercises capable of gradually arousing the latent powers of the organism."

Elimination.—The process acts directly on the skin and the general muscular system, and indirectly and secondarily on the rest of the body. Sir Lauder Brunton[2] gives a very clear explanation of how waste products are removed from the muscles. "The lymph spaces lie between the two layers of fascia covering the muscles. At each contraction the thickened muscle presses the two layers of fascia together, and drives the lymph from the spaces inwards into the lymphatics. When the muscle relaxes the layers of fascia tend to separate, and the lymph from the muscle, carrying with it the waste products, fills the spaces." This is what he calls a pumping apparatus. It is this crowding of the lymphatic spaces and the muscles with waste products which brings about the feeling of fatigue, and puts an end to muscular action for the time being. Fresh blood supply is hindered, and rest is necessary to enable the accumulation to be slowly drained away and a complete and perfect circulation through the muscle re-established. Such is the process in health, the muscular system demanding temporary rests. Trainers know that by judicious treatment it is possible to render the necessity for these rests less and less. In various morbid conditions the period of rest is lengthened, and the activity of the muscle impaired in a varying degree, even to abolition of the function altogether. From whatever cause this impairment arises, whether due to affections of the nervous system, or a local or general disease of the vascular system, or to a mixed cause, our aims in treatment must still be the same, and the foremost place must be taken by elimination. The secret of all successful treatment is *assist nature.* If we are too late to take up the rôle of trainer and bring our patient through carefully graduated exercise up to the condition of the athlete, we must adopt temporarily at least some other treatment.

[1] "Notes on some Thermal, Hydro-Thermal, Electric, and Hydro-Electric Procedures, and the Indications for their Use," by C. J. Whitby, B.A., M.D. Cantab.

[2] "Pharmacology Therapeutics and Materia Medica," by Sir T. Lauder Brunton.

We can obtain elimination in two ways—(*a*) by stimulating the muscles by medicinal or electrical means to do their own work, flogging the tired horse, which is certainly not assisting nature; or (*b*) we can execute the greater part of the work ourselves while the muscles remain in a state of perfect rest. Here we have a perfect copy of nature's process. Then our second aim—that of tonic stimulation of the nervous system—is obtained by the manipulations required to do the first, if these are done as they ought to be done. Repeated slight stimuli are tonic and strengthening, all others are exhausting.

If we attempted to gain elimination by stimulating the tired muscle to do its own work, the task would be never ending. As fast as the waste products and vitiated blood were removed, their place would be taken by the new waste material given off by the muscle in action, and we are no further advanced.

Massage is the means at our command to assist nature, and experiments have proved that it is capable of restoring the condition of a tired muscle in about one-third of the time taken by nature.

Japan is the cradle of massage. The Japanese have attained a pitch of perfection in this art it would be difficult to surpass. The practice of it is universal, and it is not kept only for departures from the normal, but is a daily incident in the life of all. The professional masseurs and masseuses are blind, and the loss of the one special sense is thought to be of advantage in developing that of touch; but all the Japs can massage, and even the common coolies massage each other to remove quickly the effects of fatigue or to allay pain. The mineral waters as baths are also much used, and baths either mineral or simple thermal are as natural an event in the life of a Jap as his daily meal. They understand the secret of using water at high temperatures, but so far have not hit on the happy idea of combining the thermal mineral water and the massage, except in so far as they manipulate their own bodies during the process of bathing. It was therefore with great interest that I took up the study of the combined process, and became convinced of its superiority over either alone. At Aix-la-Chapelle I had seen a douche massage, but I consider it inferior to that at Aix-les-Bains. It is given in the deep bath,

and both the massage and the stream of water are too powerful, causing pain in certain regions of the body, thus offending against the rules I have come to believe in as essential to the success of the treatment. The following points are claimed by the men at Aix-les-Bains as essential :—

1. *The supply of water must be copious.* For ten or fifteen minutes the water plays on the patient from two hose, each part of the body receiving attention in turn, while the water of the ordered temperature and force is applied simultaneously with the massage. The peripheral vessels dilate and allow the blood to pour more rapidly through them, all spasm of muscle is relaxed, and thus the fingers of the masseur are applied just at the right moment to allow of the maximum of result being obtained with the minimum of effort.

2. *The water must not be of too marked a character, i.e.* it must not be too briny or too gaseous. It is best of the class of which Aix-les-Bains and Bath are such good examples.

3. *It must be a natural thermal water.* I know it is a disputed point in how far Telluric heat may differ from artificial heat, but mineral waters have never yet been imitated with success, and in the absence of proof to the contrary, weight should be given to the opinion of those who have had many years' experience. I found all held this view. In Bath we have an unlimited supply of water at a higher temperature than we require it, so that there is no need to experiment with the artificial when the difficulty must, at least, come in of satisfying our first condition, viz., a copious supply. Aix-les-Bains water contains sulphur and an organic matter called "Baregine," which they claim gives the water an unctuous quality.

4. *The patient must be operated on while his muscles are perfectly relaxed.* Seated in the wooden chair this is easy to carry out for every part of the body except the lumbar region, the buttocks and thighs, regions impossible to operate on satisfactorily except in a reclining position. Dr Forestier of Aix has overcome the difficulty in a masterly and simple fashion. The chair back has been cut down and a board is placed in it, and the front edge of the chair forming at once an inclined plane on which the patient lies face downwards, completely relaxed and in the best position for the operator who stands over him. At Bath they used a table which had the

disadvantage of being cumbersome, the patient is so high the operator is at a disadvantage, and precautions have also to be taken against the table being cold and chilling the patient.

I have directed the attention of the Bath authorities to the matter and the change has at once been made, bringing things up to date.

5. *The massage while thorough must never be severe enough to cause pain.* Elimination does not require such strong measures, and by producing pain you defeat your second aim, that of tonic stimulation. Experience has taught the Japanese this lesson and massage done by them is the least hypnotic I know.

Such are the essentials of the treatment. There has been little or nothing written about our second aim, viz., tonic stimulation of the nervous system.

At Nauheim I found great stress laid on this reflex stimulation both from the saline solution acting on the nerve terminals in the skin and also mechanically by the bubbles of carbonic acid gas. Such mechanical stimulation can be claimed to a certain degree for the douche when given in the chair as above described from the trickling and running over the surface of the body of the water; the impact of the water from the hose forms a greater stimulus, as does also the manipulations of the masseur, the temperature of the water is also an important factor. Also although saline constituents are not absorbed by the skin when a body is immersed in the fluid, experiment tells us that the power of the skin to absorb is greatly increased by friction both mechanically and by reason of the quickened circulation, and in such waters as those of Bath there are gases as well as salts, and about the power of the former we as yet know too little.

It is the second aim in the treatment which will repay work. If we over-stimulate we exhaust and do harm, and we must carefully regulate our manipulations for each case and watch the result most closely if we are to obtain the best results. It is wiser to err on the side of doing too little; slow progress is often quickest in the long run.

I have spoken almost entirely of the direct action of the process, because I need not take up space in detailing the secondary action on liver, other organs, and the general system,

nor need I detail the cases suitable to this most powerful method which has such a wide range of application.

Shortly stated, all cases requiring increased excitation, elimination of toxic products, restoration of impaired or dormant function, or the establishment of heightened condition of nervous and vascular tone are subjects for the treatment if it be wisely adjusted to each case.

The increasing reputation of Bath, the only truly thermal water in England, is largely due to the special facilities existing there for carrying out this treatment.

Meetings of Societies

The Edinburgh Medico-Chirurgical Society

THE second meeting of the eighth session was held on December 5th, Mr A. G. Miller, the President, in the chair.

Dr Byrom Bramwell exhibited a man, aged 42, who had suffered from tabes for ten years, and in whom the toe reflex (Babinski's sign) was extension instead of the usual reflex on tickling the sole of the foot, viz., flexion. In certain cases in which the crossed pyramidal tracts were affected, as in spastic paralysis, extension of the great toe was the result, but in locomotor ataxia this phenomenon was not seen. Patient had thoracic analgesia, he was very ataxic, and balanced himself with difficulty; he had more or less trouble with micturition and defecation. The Argyll-Robertson pupil was present, the patellar reflex was absent. Patient had an attack of hemiplegia eleven years ago and another two years ago. There was a lesion in the crossed pyramidal tract as well as in the posterior columns, and this explained the exceptional phenomena of the case.

Dr M'Kenzie Johnston (for Mr Alexis Thomson) showed a patient, aged 24, after complete excision of the larynx for epithelioma. In August 1899, patient complained of hoarseness; and in May 1900, he had attacks of shortness of breath and difficulty in swallowing. In June, tracheotomy was performed while unconscious from sudden attack. In August, thyrotomy was performed in England, and a malignant papilloma removed from the larynx. In September, he came to Edinburgh and was examined by Dr M'Kenzie Johnston, who found larynx blocked by a soft fungating mass. On October 1, Mr Alexis Thomson performed thyrotomy, but after consultation with Dr M'Kenzie Johnston it was decided to delay removal until portion of

tumour removed had been examined. This proved to be typical squamous epithelioma, though gland removed was exempt. There was erosion of cartilage, and a quantity of pus was found on scraping the larynx. On October 4, Mr Thomson completely excised the larynx and anterior wall of the pharynx. Within a week patient was out of bed, and within five weeks he took all food by the mouth.

Mr Stiles showed a boy after operation for removal of large simple lymphoma of neck. The glands had been enlarging for two years; they extended from the jaw to the clavicle, filling the anterior and posterior triangles. Some surgeons thought it was a multiple cystic hygroma, but Mr Stiles thought it glandular, because it had a doughy, fluctuating feeling, as if a bunch of grapes were under the skin. There was no recurrence in the region of operation.

Mr Stiles also showed a girl six months after amputation at hip and removal of greater part of innominate bone for tuberculous disease. Several operations had previously been performed for tuberculous disease in different parts of the body; it had recurred in the hip, and as the patient was dying from hectic this operation was performed. A skiagram by Dr Harry Rainy showed that re-formation of some bone had taken place. The enlarged and waxy liver had diminished in size.

Dr Wm. Elder exhibited (1) specimens of brains illustrating four different seats of cerebral hæmorrhage; (2) a tumour of dorsal vertebræ pressing on spinal cord from a case of paraplegia.

Dr Byrom Bramwell showed an infiltrating glioma from a man who had frequently suffered from attacks of Jacksonian epilepsy beginning in left hand and on left side of face, but who had had no other general symptoms of cerebral tumour. Not improving under iodide and bromide, he returned with the same attacks and some loss of power in the arm and leg. Diagnosis was a small glioma in motor area. Mr J. M. Cotterill trephined over the face centre, but the brain appeared to be normal. Faradisation over the motor area, even with strong currents, did not elicit muscular contraction. Patient recovered and was discharged, but he returned later with left-sided hemiplegia, double optic neuritis and hernia cerebri; severe headache came on suddenly, and he died.

The points of importance were that there may be a brain tumour with merely localising symptoms but without general symptoms, and that faradisation may fail to produce muscular contraction.

Dr Bramwell also showed a skull cap from a patient who died three months after the operation for trephining in a case of cerebral tumour.

Dr Chalmers Watson exhibited a thermal bath cabinet for home use.

The apparatus consists in a portable folding box 3½ feet high by 2½ by 2½ feet across, made of india-rubber, with a roof arranged to fold over on to the neck and shoulders of the patient, who is seated on a suitable stool within the cabinet. The heating apparatus consists in a specially constructed methylated spirit lamp (in which pure spirit only must be used), provided with a small circular trough in which is placed hot water when a vapour bath is desired. The temperature of the dry bath varies from 100 to 200°, and the vapour bath reaches the maximum temperature of 125°. When desired the temperature is graduated by slightly opening the flaps of the roof. A vapour bath is generally to be preferred, and should be taken in a room of suitable temperature, preferably late at night, an hour before retiring. The usual accessories, such as cold water for sipping, cold cloth to forehead or head, and the like, are arranged as in a major establishment. Facilities are also arranged for sponging the body with cold water at the completion of the bath, after the excess of perspiration has been removed.

The physiological action of the bath is exactly that familiar to and described by Balneologists, and the general feeling of well-being after it is a delicious one. Some idea of its potency might be gauged by the fact that the exhibitor had in several instances seen a loss of weight of exactly half a pound result from a vapour bath of twenty minutes' duration. This fact at the same time indicated that great caution was necessary in arranging the details of the bath for medical purposes. This was specially true of stout subjects in whom the cardio-vascular disturbance might be profound.

There was no doubt that, apart from its value to healthy people, such an apparatus was calculated to be of considerable benefit in a wide group of medical derangements.

This was not the only form of bath cabinet in the market, but it was the only one of which he had any practical knowledge. Neither was it by any means perfectly new, as the exhibitor had seen cases where the patients had used the bath on their own initiative for a considerable time with, as they asserted, very beneficial results.

A special clinical meeting was held on Wednesday, 19th December, Mr A. G. Miller, the President, in the chair.

Dr M'Kenzie Johnston showed a man, æt. 24, with a large growth in the left tonsil, which had not been noticed till twelve months ago. There was slight regurgitation of liquids and alteration of voice. It was believed to be a sarcoma.

Dr Bramwell showed (1) a man, æt. 68, discharged from the army forty years ago for disease of the left elbow for which amputation of the arm was done twenty-four years ago. He suffered from pain in chest and shortness of breath, and was admitted to the Old Infirmary of Edinburgh under Dr G. W. Balfour, who diagnosed aortic aneurism; after three months' treatment with iodide he was relieved of symptoms, and since that time he has earned his living as a hawker, walking twelve to twenty miles a day and carrying a heavy pack.

Lately there has been recurrence of the pain down the arm, etc., but Dr Bramwell had not seen a patient with thoracic aneurism who had for so long a time done such hard work, and it was the most successful case of treatment by iodide he had met with.

(2) Three cases of tabes, a male and two females, all greatly improved as to their walking since treatment by Fraenkel's method by co-ordinated exercises. The cases had only been treated about a month and one of them can now walk better than she has done for the last two years and can turn sharply; a month ago she required support while walking. Dr Bramwell thinks the plan of keeping tabes patients in bed is a wrong plan.

Mr Alexis Thomson exhibited a patient, aged 15, showing result of resection of middle two-thirds of tibia, containing two Brodie's abscesses. A strong rigid tibia of normal length had formed, and within three months patient was able to walk about. The date of the original attack of osteomyelitis was 1892, and it was only eight months ago that he began to suffer from pains of a typical character.

Mr Shaw M'Laren showed a case of psoas abscess after treatment by iodoform emulsion injection. After evacuation of the abscess by puncture, several ounces of 10 per cent. iodoform emulsion were injected into the cavity and the wound sewn up. It was a typical case of abscess from a tubercular spine and in six weeks it was entirely healed.

Mr M'Laren then showed a patient with tuberculosis of wrist treated by iodoform emulsion injection. Four years ago a patient came with a large swelling on wrist, which was recognised as tubercular teno-synovitis, and removed. Two years later he returned with a recurrence which was removed, and again two years afterwards he returned with tuberculosis of the wrist-joint. Eight injections of 10 per cent. iodoform emulsion were made with excellent results.

Mr Shaw M'Laren also showed a patient after complete removal of the tongue and glands for cancer two years ago.

Mr Stiles showed a patient after operation for perforated

gastric ulcer. For nine months the patient, a servant girl, had suffered from slight indigestion, when one morning, after a good breakfast, she felt sudden severe pain in the stomach. Severe abdominal pain and a state of collapse continued for some hours, and there was vomiting of coffee-coloured material. Though there was little or no absence of liver dulness, the diagnosis was perforated gastric ulcer. There was great trouble in finding the perforation, which was on the posterior wall and near the œsophageal opening, and in this connection it was interesting to note that for the previous two months she had had a sharp pain on eating at the lower end of the sternum. The tube was taken out on the tenth day. The perforation took place at 8.30 A.M., and the abdomen was opened at 1 P.M. same day.

Mr Stiles next exhibited a girl with complete avulsion of scalp showing result of skin grafting.

Mr Stiles' next patient was an infant three months after removal of a large occipital meningocele, 16½ inches in circumference. The tumour was heavy, the skin over it excoriated and ulcerated, the pedicle was 5½ inches in circumference, the opening in the bone about the size of a shilling. To prevent the escape of cerebro-spinal fluid after the operation, the skin flaps were cut so large that not the edges but the surfaces came together, like a ship's keel. The child left the hospital on the thirteenth day.

Mr Stiles also showed an infant, aged four months, after operation for acute intussusception. The history was characteristic. In the evening, while being nursed, sudden pain came on, followed by vomiting, and during the whole night there were intermittent spasms; blood-stained mucus was passed by the bowel. On arrival at the hospital a tumour was felt under the left rectus, extending from the left costal margin to the left iliac margin. The reduction of the apical third was found difficult, as usual. No amount of inflation would ever have reduced this case, and Mr Stiles said he did not, as a rule, believe in inflation, but advocated immediate opening of the abdomen.

Mr Stiles' last case was that of a boy with paralysis of the right gluteus maximus, the result of acute anterior poliomyelitis. The boy complained merely of lameness; there was no pain, no shortening, no malposition; the point to note was that he was most lame when going downstairs. The right gluteus maximus was much atrophied and did not contract when he raised and held up the limb; it did not react to the faradic current.

Dr Norman Walker exhibited a young woman with morphœa

of the scalp. At first sight it looked like alopecia areata, but the skin was infiltrated and hard. Usually there was a history of injury, and in this case it was apparently a wound made by the forceps at birth.

Dr Walker showed a lad who had arrived in Edinburgh a few days ago from Northumberland and had already developed favus.

Dr Bruce showed a case of paralysis after removal of the twelfth dorsal lamina. It will be described in full in a future number of *The Scottish Medical and Surgical Journal.*

Dr W. Allan Jamieson showed microscopic specimens from the case of cervical skin tumours shown at the November meeting.

Mr Shaw M'Laren showed (1) a recent Potts fracture from an old woman who had died ten days afterwards of pneumonia. The fibula was broken one inch above the lower end and the tip of the lower end of the tibia was broken off, yet the appearance during life was characteristic of Potts fracture; (2) a radiograph of fractured internal condyle of humerus lodged between humerus and ulna; (3) a radiograph of fracture of astragalus, with subastragaloid dislocation of foot forwards.

Mr Stiles showed (1) a portion (3½ inches) of hatpin removed from bladder of a middle-aged man by suprapubic cystotomy. (2) A brain showing abscesses in occipital lobe secondary to an injury to the fore part of head. In this connection Mr Stiles said that if a hernia cerebri progresses, it may be concluded there is either meningitis or abscess. (3) A congenital fatty tumour from the axilla of an infant. The difficulty lay in the diagnosis from a cystic lymphangioma.

Dr Harvey Littlejohn exhibited (1) a brain from a case of apoplexy. The patient, having partially recovered, committed suicide by cut throat six weeks afterwards. (2) Cut throat from the above case, the cut having been made unusually high, viz., above the hyoid. (3) A specimen of complete rupture of the small intestine from a simple fall. While the worse of alcohol patient fell across a rail on the railway; he managed to walk home, went to bed and slept well. In the morning he commenced to vomit, and as this became worse he took a cab to the hospital but died on the way. Necropsy showed a loop of intestine in right iliac fossa completely cut across. (4) A double uterus. (5) Acute inflammation of the stomach.

Obstetrical Society of Edinburgh

THIS Society held its second general meeting under the presidency of Dr Milne Murray, on the 12th inst. The meeting suffered from a complaint peculiar to the Society, an *embarras de richesses*, and the last paper on the billet had to be held over until the next meeting. A large number of new Fellows were admitted to the Society.

Amongst the specimens exhibited by the President and other members of the Society, perhaps the most interesting was an omphalopagus twin monster, born at full time and weighing fully 15 lbs., shown by Dr F. W. N. Haultain. The dissection showed that a fibrous septum separated the two livers. Two other specimens, one of cancerous uterus removed by Dr Haultain by the vaginal route from a patient aged 29, and another of early cancer of the cervix removed by Dr Scott MacGregor by vaginal hysterectomy from a patient aged 26, merited attention.

Dr J. M. Munro Kerr of Glasgow read a paper on "Spoon-shaped Indentations in the Skulls of the New-born, with illustrative cases and a new method of treatment for the immediate relief of the deformity." The author stated that this subject had not as yet received much attention, either in this country or in Germany, but in France much interest was attached to it. The depression may be spoon or furrow-shaped, and the latter is much less serious. The former occurs on one or other parietal bone, and the accident is frequently met with in Glasgow on account of rickets causing pelvic deformity. Dr Kerr then enumerated the causes likely to produce these depressions, and stated that the furrow-shaped deformities might be due to the action of the forceps, but that it was unlikely that they produced the spoon-shaped variety. The *prognosis* was generally not unfavourable, and within one or two weeks the depression usually disappeared. In a certain number of cases the deformity persists permanently, and a slight degree of mental disturbance may also be present. In other cases much graver nervous symptoms may be present, as a total apathy and refusal to take food on the part of the child. Or, again, the child may be dead-born or so deeply asphyxiated that death soon ensues. When the injury occurs to the after-coming head the prognosis is much more grave, as traction may have been applied to the vertebral column. The mortality amongst children with the aggravated deformity is high; amongst the author's own cases of five children born so, two died. As regards treatment, Dr Kerr enumerated the various methods which have been employed, as by traction on depressed bones, trephining, pushing out of the bone from within. He

described the mode of treatment which he has found successful, namely, compression of the head in an antero-posterior direction, and as the bones are very resilient, small force is necessary to produce elevation of the bones.

In the discussion which followed, the President thought antero-posterior pressure, combined with compression of the skull vertically, would help still further to reduce the deformity, except in those cases where actual fracture of the bones had taken place.

Dr Michael Dewar read "A Clinical Note on Eclampsia at the Sixth Month—Recovery—Successful Labour at the Full Term."

Mrs M., a married primipara aged 28, is one of a family of six, of whom two died in infancy. The father died in 1879 of inflammation of the lungs. The mother and three living sisters have always enjoyed good health. The mother had normal pregnancies and easy labours. The patient herself has had no illness during her lifetime, except measles in childhood and whooping-cough at the age of 20. She has not had scarlet fever. Menstruation has always been normal. She never had fits before the present attack. During the first six months of pregnancy she was in perfect health, with only slight œdema of feet and ankles, more on right than left. The urine was normal in quantity and appearance. The bowels were constipated. Suddenly at 6.30 P.M. on 27th June, without warning, she took a fit, and during the first hour she had seven. On my arrival after the seventh fit she was lying on her left side, with the knees drawn up, unconscious, breathing stertorous, pupils contracted and non-sensitive, and face flushed. The skin was moist. The pulse 120 of high tension. On examination I found that the urine had been passed involuntarily. Shortly after she had the eighth fit, in which the face was drawn to the right. It began with a long tonic convulsion, succeeded by a series of strong and rapid clonic contractions involving the whole body. The attack lasted about three minutes, followed by the condition she was in when I first saw her. The bowels were emptied of hard scybalous masses. The ninth fit then came on, lasting for over two minutes. The bladder was then emptied of about a tablespoonful of urine, which was non-albuminous. *Per vaginam* the os was closed and no discharge—no uterine contraction, and fœtal sounds distinctly heard. She was then seized with the tenth fit, the last on this occasion. After this seizure she gradually became conscious or partly so, being dazed and having difficulty of speech. Bromide of potash and chloral were administered, which sent her off to sleep. During the next four days she was fairly comfortable, but still confused, and had no more fits. On the evening of 1st

July she had a second series of convulsions, seven in number. Chloroform was administered, and 10 ♏ tinct. verat. virid. injected hypodermically. After recovery bromide of potash and chloral were given, and 10 ♏ tinct. verat. virid. every six hours. On this occasion there was a trace of albumen. Next day the pulse was eighty, but intermittent. *Per vaginam* examination was negative. The tinct. verat. virid. was stopped and bromide of ammon. and sodium were given. Four days afterwards, on 4th July, she had the third series of fits of similar character. The urine non-albuminous. From this day onwards she gradually recovered—still somewhat confused—and my visits ceased on 11th July. Three months after the first attack she was delivered of a fine healthy boy naturally and easily, and made a quick and good recovery.

Remarks.—The question may be asked, was this a case of eclampsia or was it epilepsy? As the family and personal history, and the clinical features negatived the view of epilepsy, the diagnosis must be eclampsia. Cases were quoted to show that albuminuria was not always an accompaniment of eclampsia, and therefore could not be the sole cause of the fits as is maintained by some observers. It would be better, therefore, to classify all cases of convulsion occurring during the puerperium as eclamptic, irrespective of the presence or absence of albuminuria. That these convulsions cannot be entirely due to albuminuria is shown clearly by the fact that there are many cases of albuminuria in pregnancy, in which no convulsions occur during the whole puerperal period. If albuminuria has a proprietary right to eclampsia, every obstetrician would have to face a great many more cases of the disease in his practice than actually falls to his lot. There are evidently some subtle conditions existing or ready to be called into existence by peripheral or other influences, which determine what cases are to be affected by eclampsia and what are not. Septicæmia occurring in the simplest case of labour, while not occurring in some of the most difficult instrument and version labours, was cited as an example to show that something else—a streptococcus—was the determining cause of the septicæmia. A parallel was also shown in acute and chronic Bright's disease, where only a certain proportion of cases developed uræmic fits. The probability is that a bacillus may be found by a steady and systematic examination of the blood to be the initial cause of these eclamptic convulsions.

As regards treatment, I do not think that chloroform does all the good that is claimed for it—it can only deepen the coma. Morphia is practically fatal when albuminuria is present. Veratrum viride should be used with caution. Saline

solution must tend to increase blood pressure at first, and then lead to cerebral hæmorrhages.

Perhaps a little more of the expectant treatment, after attending to the bowels and bladder, with the administration of bromide and chloral, is the best method of managing such cases.

If there be no sign of nature having commenced premature labour, I would wait for a day or two, at any rate, before practising fœticide, but if the os was opening up and uterine contractions taking place, the sooner the uterus is emptied the better.

Glasgow Obstetrical and Gynæcological Society

ON November 28th the meeting was held in the Maternity Hospital, when the President, Dr Robert Jardine, delivered his presidential address on "Glasgow Maternity Hospitals, Past and Present." He first gave an account of maternity work in Glasgow before hospitals were started. In the sixteenth and seventeenth centuries the work was largely in the hands of midwives, and with their morals the Kirk concerned itself. As was evident from a passage which he quoted from Duncan's "Memorials of the Faculty of Physicians and Surgeons of Glasgow," in which it was stated that one, Kate Freeland, was summoned before the Presbytery on the 4th April 1589, "To answer for her professioun to be ane midwife, and to underly ye censure of ye Kirk according to her demerites."

Dr Jardine mentioned further that in 1740 the Faculty had instituted an examination for midwives. It was enacted that, "after the 1st January 1741, any midwife who shall pretend as such to practise within the districts of Lanark, Renfrew, Ayr, and Dumbarton without a licence from the Faculty, shall be fined in the sum of forty pounds." Two shillings and sixpence was the only charge made to the midwives for the licence. The burning question of registration of midwives was therefore no new thing in Scotland.

The first Maternity Hospital of which he could find records was a small private one started in 1791 by James Towers, surgeon. This gentleman was the first Professor of Midwifery in the University of Glasgow, and was appointed in 1815.

In 1805, an attempt was made to found a public lying-in hospital, but it failed. But Dr James Wilson succeeded in the attempt in 1834.

This hospital was long hampered by want of funds and suitable accommodation. Epidemics of puerperal fever were common, but in spite of opposition the hospital struggled on, until the present building was at last achieved in 1881. Though no doubt

in that year it was an up-to-date hospital, it was now far from an ideal place in which to carry out the work they were called upon to do. The hospital was too small, and there was neither operating theatre nor isolation ward. The operative work had increased tremendously, quite ten-fold, in the last decade. From 1834 to 1844, in the first hospital, 445 cases were attended. In these there were done only 6 forceps cases (1 in 74), 2 versions (1 in 222), 1 craniotomy (1 in 445), 9 operations (1 in 49); while during the ten years (1889 to 1898) there were 4322 cases, of which 600 required forceps (1 in 7), 154 versions (1 in 28), craniotomy in 112 (1 in 39), induction of labour 90 (1 in 48), Cæsarean section 56 (1 in 77), *post-mortem* Cæsarean section 2 (1 in 2161)—1064 operations in all (1 in 4).

Dr Jardine made a strong appeal to the Fellows of the Society to make known the wants of the institution to their wealthy friends. He felt confident that if the public once realised that their work was hampered by the want of proper accommodation, that funds would soon be provided for a hospital worthy of the great City of Glasgow.

The address was closed by reference to the different men who had been chief physicians in the hospital. The founder, Dr James Wilson, and his son, Dr J. G. Wilson, had been on the staff for nearly fifty years. Dr Jardine also showed a large number of interesting specimens and all the most modern apparatus and instruments.

A very hearty vote of thanks was accorded him on the motion of Dr W. L. Reid.

Aberdeen Medico-Chirurgical Society

A MEETING of this Society was held on December 6th, Dr G. Watt, President, in the chair.

Dr J. F. Christie, Thomas Fraser and Alexander Walker were elected resident members, and Dr David Lawson, Nordrach-on-Dee, a non-resident member.

Dr George Rose read a paper on *pseudo-hypertrophic muscular paralysis*, with exhibition of a case. After giving an outline of the main features of this condition and laying stress on the essential pathological difference from atrophy of spinal origin, Dr Rose read notes of his case and exhibited the patient, a boy of 9½ years. He also showed a series of excellent photographs, illustrating the various stages in his patient's mode of rising from the ground. Microscopic slides and drawings, to show the microscopical condition of the muscles, were also shown. Dr A. W. Mackintosh exhibited, for the sake of comparison, another case of the same affection but at a somewhat further

advanced stage. Dr Rose's paper will appear *in extenso* in a later number of the Journal.

Dr F. Kelly read *notes on a case of acute cellulitis created by anti-streptococcic serum.* After giving a careful and interesting review of the literature on the use of anti-streptococcic serum and referring to the various sequelæ that have been recorded, Dr Kelly read the notes of his case of acute cellulitis, commencing in a hand, and shown bacteriologically to be due to streptococci. After various operative measures had been tried, an injection of 10 c.c. of anti-streptococcic serum was administered on three occasions with satisfactory result. Among the many interesting and instructive points brought out in the course of this case were the facts, that a cold abscess developed at the site of the first injection and was found to be teeming with living streptococci, and that a severe general urticaria appeared a week after the last injection, resisting all medicinal treatment but yielding almost at once to free drainage of the abscess. Dr Kelly's paper will also appear *in extenso* later in this Journal.

The papers gave rise to interesting discussions in which Drs A. Fraser, Finlay, Gray and G. M. Duncan took part.

Edinburgh Royal Medical Society.

Nov. 16th, 1900, Dr G. Lyon in the chair.

Dr W. J. Stewart, Senior President, gave as his presidential address an account of a work by M. Dionis, a surgeon and teacher in Paris in 1710.

Dr W. T. Ritchie read a dissertation on "Immunity," in which he gave an account of the present state of knowledge on the subject, and added a description of some methods of preparing and exhibiting immunising sera.

Dr A. M. M'Intosh read a dissertation on "The Errors of Micturition," dealing chiefly with their value as symptoms and guides to diagnosis.

The diplococcus of acute rheumatism was shown by Dr Grainger Stewart.

Nov. 23rd, Dr G. Lyon in the chair.

An address on "Specialism in Medicine" was read by Dr R. A. Ross, Second President. Thereafter Dr W. J. Stewart read notes of four urinary cases admitted to the Royal Infirmary, Edinburgh, complaining of "blood in the urine with some pain."

(*a*) Tubercular cystitis in a boy of 9, treated by suprapubic drainage of the bladder.

(*b*) Papilloma of the bladder in a man of 78, removed suprapubically.

(*c*) Suprapubic lithotomy in a man of 64, who was an old patient of the late Professor Syme.

(*d*) A large pedunculated tumour about the size of four walnuts put together, growing from the third lobe of the prostate. A suprapubic incision was made and the tumour removed. Microscopically it showed practically normal prostatic tissue.

Nov. 30th, Dr Stuart in the chair.

Dr G. Lyon, Third President, delivered an address on "Education."

Dr A. Shearer read a dissertation on "Epilepsy."

Dr A. M. Wood gave an account of a case of malaria, and showed specimens of the parasite in various stages of development. The case was that of a man who was in the Madras Presidency for a few weeks about nine months ago. He contracted malaria and had to come home, and has suffered from frequent attacks at short intervals ever since. Clinically a "double tertian" was diagnosed. Blood films showed many parasites of large size and a few of smaller size. On two occasions crescents were seen, indicating that the case was complicated by a fever of a malignant type.

Dec. 7th, Dr Stuart in the chair.

Dr L. C. Peel Ritchie, Fourth President, gave an address on "Heredity."

Dr F. S. Rose read a dissertation on "Complications of Gonorrhœa," and Dr Henderson read a paper on "Quacks and Quackery."

New Books and New Editions

A Text-Book of Pathology in relation to Mental Diseases. By W. FORD ROBERTSON, M.D., Pathologist to the Scottish Asylums. Edinburgh: William F. Clay. 1900. Price 21s.

Dr ROBERTSON has written a unique book, because so far as we are aware, it is the first attempt at a manual of pathology in relation to insanity. Most text-books are largely compilations of other men's labours with the stamp of originality only in the method of grouping and treating the subjects discussed, but in writing this volume the author had to face the description of what up till a few years ago was absolutely unknown ground with no familiar landmarks and no definitely recognised limitations. One striking feature of the book is the fact that in every chapter the writer speaks from a personal experience which constitutes him an authority; and even in those subjects which

Dr Robertson has not had the time or opportunity to work out entirely for himself, he has carefully studied all the results attained by others. An invaluable bibliography concludes each section and greatly enhances the value of the book.

The opening pages on methods of making *post-mortem* examinations upon the insane and the fixing and staining of tissues require little comment, and comprehensive accounts of affections of the scalp and especially of hæmatoma auris follow.

A well-written if somewhat technical chapter on morbid conditions of the skull with elaborate description of measurements, peculiarities of structure in the insane, and references to thickness, texture and weights of skulls demonstrates the interest the writer has taken in researches which are rarely pursued by the ordinary mortal. Clear, succinct accounts of the different abnormalities in form and size of the skull and special parts of it cannot fail to be of value to the student.

The sections on the structure and pathological changes in the dura mater and pia-arachnoid were, as the author states, already jointly published with Dr Middlemas, but the time which has elapsed since then renders much of what is now stated more valuable because better matured. The descriptions of the vessels in these membranes, the sub-dural false membranes and the hyaline bodies are of special interest, and every possible aid is given by coloured sketches, so as to make the structural details clear and easily understood. The channels by which the cerebro-spinal fluid leaves the brain, reaches the sub-dural space, and entering the dural lymphatics finds its way into the venous sinuses, supplies a suggestive explanation of the mode of formation of these sub-dural membranes in cases where the cerebro-spinal fluid may be reasonably conceived to be loaded with impure or effete products.

The chapter dealing with the neuroglia deserves special mention because in it Dr Robertson in a modest and unassuming manner gives the results of his own discoveries mainly by his platinum method. From these researches he has established almost beyond dispute that the neuroglia contains two elements in place of one. Platinum stains deeply what he calls mesoglia cells, while it leaves the neuroglia cells and fibres unstained; and the mesoglia cells, occurring as they do in equal numbers with the neuroglial, have passed unrecognised by such masters as Weigert, Golgi, Lenhossék and many others. It is true that no definite light is thrown on the rôle that these mesoglia cells fulfil, further than the facts that they do not take part in repair of the nervous tissues, and owing to their comparatively short processes coupled with the fact that they do not send processes

to the vessels, they cannot act as efficient supporting structures. Dr Robertson thinks they may correspond in function, to some extent at least, to endothelial cells, or connective tissue corpuscles in fibrous tissue, and may act as phagocytes but do not form fibrils. An excellent if brief résumé of the changes noted in insanity in the neuroglial tissue is appended, although little can yet be stated as to the corresponding alterations in the mesoglial cells. This is largely due to the very uncertain results obtained with platinum and to the blackness of the precipitate in these cells, so that we must wait with patience for a better method to yield clearer results. Dr Robertson thinks that amyloid bodies, so-called, are often mesoglial cells which have undergone a peculiar hyaline degeneration. The coloured illustrations of neuroglial and mesoglial cells are of great interest and merit.

There is one part of the book in which the author practically effaces himself and gives us an admirable digest of the work of others, and this is the section on the pathology of nerve cells. It is here that we must look rather to the future than the present and trust that the enormous amount of work done in the past may eventually lead to far more valuable and precise knowledge. Dr Robertson admits the difficulties that confront any research into the changes in the nerve cells in the brains of the insane and the small results already achieved. The difficulties to our mind are the impossibility of getting absolutely fresh material in which no *post-mortem* change can have occurred, and the want of a really truthful fixing agent. Dr Robertson clings to formaline, not as the best, but as a good fixative, although in our experience disastrous shrinkage invariably results from its use.

The chapters on the physiology of the lymphatic system and cerebral circulation leading up to the pathological changes in intracranial pressure are amongst the most interesting pages in the book. Dr Robertson handles a peculiarly intricate subject clearly and well, and attacks with great vigour the Monroe-Kelly doctrine and Leonard Hill's conclusions which so far support that theory. He thinks that brain tissue *is* compressible. and the evidence he brings forward is convincingly stated, and he insists upon the recognition of the ease with which the copious amount of lymph in the interstices of the brain tissue can be displaced. Establishing his premises, Dr Robertson then strives to show the number of pathological conditions which depend more or less entirely on interference with the lymph channels in the meninges. The questions of cerebral congestion and anæmia and the results of cerebral hæmorrhage are skilfully handled in the light of his conclusions.

Some clinical types of mental disease conclude a book which merits careful perusal and is throughout most suggestive. The author in dealing with theories is not merely destructive, but largely constructive, and if we cannot accept all Dr Robertson's conclusions, we cannot help feeling that he has brought many months and years of work and careful thought to bear upon the problems which he discusses. We heartily desire for the volume the success it undoubtedly merits; and we congratulate pathology in Scotland on the appearance of a work of such sound scientific value, and characterised by so much erudition, technical skill, and outstanding ability.

"NEURON."

Angioma and other Papers. By the late JOHN DUNCAN, M.A., LL.D., M.D. Edited by JAMES HODSDON, F.R.C.S.Ed., with Memoir by Professor CHIENE. Pp. 177, with Portrait. Edinburgh: Oliver & Boyd. 1900. Price 5s.

TO put this book into the hands of an old student of John Duncan's is to make him envy Tantalus. His appetite is keenly whetted by a page or two of a paper only to find that it suddenly stops; or he reads another which is complete indeed, but which is so satisfying and interesting that he rebels at the small number of pages that lie between the covers of the book. Take the fragment on Osteomyelitis for example; it is most evidently a fragment, for it begins with a case of difficult diagnosis, and adds only some loosely connected paragraphs; but its too scanty pages—little more than a couple—touch on some most interesting questions which his rich experience and orderly mind could so well have dealt with. We urged him more than once to write a monograph on this subject of Osteomyelitis. At the first operation we can recollect him doing, he was opening up a bone the subject of this disease, and we remember the impression produced on the junior student who knew nothing of what the procedure meant, but who was struck by the tall, handsome man smiling down on the poor bone which he chipped away at like a carpenter, with a mallet and chisel in his big, powerful hands. Small hands are rather the fancy for surgeons, but Duncan's assistants could have defended the view of William Morris, the poet-artist, who used to look with some pride on his own muscular fore-arm, and always asserted that it was the big-handed men who were his most cunning workmen in brass. And since that first operation we have often longed for an essay on that most interesting disease from the pen of

John Duncan. The etiology, the causes of the different varieties, the description of the clinical features and morbid anatomy, the rules to guide treatment—what a rich, satisfying treatise it would have been! And all we have is two pages!

But fragments though some be, none of them fail to stimulate, and of course there are complete papers too. Naturally those on *Angioma* and *Electrolysis in Aneurism* occupy the place at the beginning of the book. He spoke as a master on those subjects, and the papers contain many instances of the elegant expression of the clear and suggestive thought so characteristic of him. The classification of angiomata and the arrangement of the means of treatment are orderly; and the clinical writing in the description of symptoms and the results of treatment is so authoritative and so evidently the result of a wide and carefully studied experience, that it is a delight to read the sixty or seventy pages which deal with these subjects he made so much his own. The fragment on *Inflammation* is quite annoyingly interesting; the papers on *Classification of Ulcers* and *Tuberculous Arthritis of the Knee* are well worth perusal. The former is an example of the way of regarding a subject which made Duncan's teaching so valuable and so refreshing to students; indeed, many a page in this book is just what is wanted to guide and delight the earnest, and to stimulate the apathetic student. What, for example, could be better for a student in teaching him the "perspective in surgical symptomatology" than the paper on *Pain as a Symptom of Fracture*, or that on *Epithelioma of the Mouth*? In this last paper he writes—and the paper was written twelve years ago—"I believe that the time will come when malignant disease will be proved to have a similar origin," that is a microbic cause; and there followed the statement an admirable discussion of the arguments for and against this view. In discussing the operative treatment of tubercular joints, he writes, "I feel convinced that, with increasing experience, the surgeon tends more and more to conserve the life rather than the limb, the limb rather than the joint. As each advance in surgical therapeutics diminishes the danger of conservatism, he draws his line back in accordance with the logical consequence of the improvement. Where the comparative risks differ but little he preserves, but the tendency with many is to extend a new improvement further than is legitimate, and it is well, in such circumstances, to draw attention to the conditions of the problem, and in this particular case to define, so far as may be, the reasonable limitations of arthrectomy as compared with excision and amputation." We remember him—it must have been twenty

years ago—saying to a circle of students after an impressive pause, "The older I grow, the less do I attempt to save limbs." He had a way of firing a shot into us like this, and then, after he had watched the effect, explaining to us, with a smile and a slow nod of his head, what he meant.

We notice at least one sentence where what looks like an error in punctuation leads to some confusion, and there is an awkward grammatical mistake on page 41. There is a good portrait facing a short "memoir" by Mr Chiene. The profession will be grateful to Mr Hodsdon for collecting and editing so well these papers. Some of them are reprints, and in them a few details now read perhaps out of date. But we are thankful for them all. Thankful in truth, but with a feeling of deep regret that one who Mr Hodsdon justly says "was regarded by many as the most accomplished and most scientific teacher of clinical surgery of his day" did not live to carry out his intention of writing a book on that subject. "Duncan's Lectures on Clinical Surgery"! They would have become a classic, rivalling Paget's and Billroth's. "LITHOTRITE."

The Conservative Treatment of Tubercular Joint Disease and Cold Abscess. As carried out at Breslau by Prof. J. von Mikulicz, LL.D. Edin. By Dr A. HENLE, with Preface by Prof. J. VON MIKULICZ. Translated from the German by CHARLES W. CATHCART, F.R.C.S., Senior Assistant Surgeon, Royal Infirmary, Edinburgh. Edinburgh: E. & S. Livingstone. 1900. Price 4s. 6d. net.

WE had almost begun this review with the condensed syllogism, "Every practitioner has to deal with tubercular joint disease: therefore, every practitioner should read this book." Truth to say, the sentence well represents our feeling with regard to this work of Henle which Mr Cathcart has translated. In a note the translator writes: "Although the conservative treatment of tuberculous joints has many able advocates among British surgeons, there is no short and authoritative account in English of certain therapeutic measures which have strengthened and improved this line of treatment in recent years. Dr Henle's interesting account of the methods which Professor Mikulicz has found useful in his extensive practice at Breslau, is so suggestive in its explanation of obscure points, and so exact and careful in its record of clinical experience, that it has only to be known in English form to be appreciated in this country as it deserves." The claim is virtually made in this book—and we think justly—that a large proportion of tubercular joints, even where rest alone as a therapeutic measure would fail, can be cured without opera-

tion, and that psoas and other "cold" abscesses can be replaced by firm cicatrix by means of a procedure which any practitioner could adopt, though he had had no special practice in surgical work. The matter with which the book deals, then, is one of the first importance to the medical profession and not to surgeons alone.

Mr Cathcart has been so fortunate as to secure a most interesting Preface to his translation from Professor Mikulicz in whose clinic the methods have been followed which Henle describes. Mikulicz refers to the difference in the point of view which has for more than a century distinguished the practice of those who sought to cure joint disease by conservative methods on the one hand, or by operative methods on the other. The antiseptic discovery seemed to decide at once in favour of the operators, "and so we see that in the middle of the seventies of the century just past" (loyal Mikulicz, to believe with his emperor that the new century began with 1900!), "most of the surgeons . . . decided in favour of as extensive an application as possible of excisions and atypical operations on bones and joints."

But though the immediate results were brilliant, a reaction followed, for the ultimate results were often far from satisfactory, both in the return of the disease, and in the poor functional condition of the joints operated on. At the same time improvements took place in the conservative methods, due mainly to three factors, the introduction of iodoform for the treatment of local tuberculosis, the use of Bier's congestion method, and the perfecting of orthopedic apparatus employed for diseased joints. "By the use of these means," says Mikulicz, "the conservative method of treatment of local tuberculosis is in my opinion far superior to that by operation." After giving a full trial to operative measures, he finally arrived at the conclusion just stated. He perfected the conservative methods as far as possible, and the fruit of his work is described in Henle's book, now translated by Cathcart. "I consider," Mikulicz continues, "that this treatise serves a very valuable purpose in making the method of treatment known as widely as possible to the medical profession. It is concerned with diseases which every practitioner has an opportunity of observing, and it deals with methods of treatment which can be practised by those who are not entirely devoted to surgery." No hard and fast rule, of course, is possible; the limits of the method are admitted.

Amongst the conservative methods, Henle deals with iodoform-glycerine injection, venous congestion, operative procedures, and orthopedic methods. It is with the first two of these that this book is mainly concerned. The chapter on iodoform injection is most interesting. The action of iodoform on the

tissues and on bacteria is discussed, and an explanation of its curative influence is found in its antiseptic properties (which are, however, slight), and in the definite power it has to irritate the tissues of the body and to stimulate cicatricial contraction. The danger of poisoning by either the iodoform or the glycerine is touched on; but it is easily avoided. Then full directions are given for the systematic injection of the various joints, and no man who reads this section need be at a loss as to how to carry out this part of the treatment.

It is recommended in many cases to combine the iodoform injection with Bier's congestion treatment. As is now well known, this latter method consists in producing venous congestion of the joint by applying above it an elastic bandage with firmness sufficient to interfere with the venous return, but not so tightly as to obstruct the arteries. Its usefulness is well established. Mikulicz recommends that it should be used first, and after some time that the iodoform injection should be added. "Cold abscesses" often occur under the influence of congestion, and are rather to be welcomed than otherwise, for they constitute a form of the tubercular process which, if properly treated, is very likely to result in a cure; and they are peculiarly amenable to treatment with iodoform.

As regards the indications for the conservative treatment, Henle states that it should be tried in all cases of joint tuberculosis except in the knee in adults, where for any reason a moveable joint cannot be expected; these cases are excised at once, and, of course, amputation is performed in some serious cases.

And the results. About 80 per cent. of the cases treated by iodoform injection alone are recorded as cured. We would specially draw attention to the value of the method in the treatment of psoas abscess, a class of cases in which this method has given us most gratifying results. Nothing is required except this—no serious operation, no excision of the sac, no drainage with its risk of sepsis, no scraping of the abscess wall—only antiseptic precautions, puncture of the abscess with a trocar and canula to allow the pus to escape, injection of the iodoform in glycerine, and a simple dressing. The sac will probably refill, and the process require to be repeated, it may be twice or oftener; but in a few weeks, a huge abscess, extending, it may be, from the abdomen to the middle of the thigh, has disappeared without the knife, and with no risk of the dread sepsis.

The book is well printed, is not too large, and is in a form pleasant to read. We do not doubt the profession will be grateful to Mr Cathcart for his translation, which is admirably done, and is pleasantly free from the scent of German idioms; nor that the book will be widely read, as indeed it deserves to be.

"LITHOTRITE."

A Handbook of Diseases of the Eye and their Treatment. By HENRY R. SWANZY, A.M., M.B., F.R.C.S.I., Surgeon to the Royal Victoria Eye and Ear Hospital, Dublin. Seventh Edition. Pp. 633. London: H. K. Lewis. 1900. Price 12s. 6d.

THE seventh edition of this well-known and admirable handbook of diseases of the eye is enhanced by such important additions as a detailed account of the employment of the Röntgen rays for the detection and localisation of foreign bodies in the eye, and the description of Mules' operation for the relief of ptosis. Moreover we notice throughout the work minor additions, alterations and improvements, especially in therapeutics, and the addition of some new diagrams.

The work has been thoroughly revised and brought up to date, and we have no hesitation in heartily recommending it to students and practitioners, believing, as we firmly do, that it is one of the best, if not the best, handbooks published on diseases of the eye in the English language.

Recent Literature

CRITICAL SUMMARIES AND ABSTRACTS

MEDICINE

THE CAUSE OF THE APICAL COMMENCEMENT OF PULMONARY PHTHISIS

By G. LOVELL GULLAND, M.A., B.Sc., M.D., F.R.C.P.Ed.,
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WE are so thoroughly accustomed, especially of late years, to regard consumption as an inhalation tuberculosis, that it comes with something of a shock to find an authority like Aufrecht seriously advancing the view that it is, initially, a vascular or miliary tuberculosis ("Die Ursache und der örtliche Beginn der Lungenschwindsucht," Wien, 1900). The shock is peculiarly rude, since Birch Hirschfeld's paper ("Ueber den Sitz und die Entwicklung der primären Lungentuberkulose," *Deutsch Arch. f. Klin. Med.*, 1899, vol. 64) had left us comfortably settled and satisfied with the other view. The matter is one of the utmost importance, because if Aufrecht's view is correct, it means, of course, that all the outcry about the danger from the sputum of consumptives is so much waste of breath, and that we should turn our attention mainly to keeping our food and drink free of tubercle bacilli. A re-examination of the subject in the light of what these authors have to say may not be out of place.

It is notoriously difficult to get pathological material which illustrates the very early stages of phthisis, as it is only when patients die of some intercurrent disease or accident that lungs showing the very earliest stages of tubercle can be examined. Aufrecht has kept an eye on this point during the whole of his thirty-five years of hospital experience, but rejects all his earlier observations, because it is only since his work on inflammations of the lung, published in Nothnagel's series, that he has felt himself competent to give an authoritative pronouncement on these conditions. In the last two years he has carried out about five hundred *post-mortem* examinations, and in three of these he found small foci in the apex of the right lung, while nowhere else in the lungs, nor in other parts of the body, was any trace of tubercle to be found. The microscopical examination of these foci convinced him that there was no question in them of a catarrhal pneumonia, or of any form of disease extending from the bronchi or finer air-passages. The changes were much more like those seen in infarcts of the lung, the result of local thrombosis of vessels. On further search he found that the vessels near the foci were affected in the same way as those in the neighbourhood of an infarct, that is, their walls were greatly thickened, and in particular the adventitia was widened by fibrinous degeneration of its fibres, whilst all layers of the wall were infiltrated with numerous cells. In the second of his cases he was fortunate enough to have the thrombosed vessel leading to the focus in the plane of his sections, so that there was no doubt of the connection between the two. Aufrecht considers that the thickening of the vessel-wall preceded the thrombosis, and bases this opinion on his previous researches on lung-infarcts, and on the fact that he found other vessels near the foci whose walls were similarly thickened, though thrombosis had not yet taken place. His view, therefore, is that the changes in the lung which form the commencement of phthisis proceed from the smaller vessels, whose walls are thickened and then thrombosed, so that the portion of lung supplied by these arteries is destroyed in the manner of an infarct, that is, ceases to have an organic connection with the surrounding healthy tissue.

He then proceeds to show that this theory can be utilised to explain facts in pulmonary pathology which have hitherto been matter of debate. For example, the hæmoptysis, which is often the earliest symptom of phthisis, would be of the same character as that which results from any embolic infarct; the occasional discovery in early cases of small smooth-walled cavities, or of dead tissue at the apex of the lung surrounded by a smooth membrane—the beginning of a cavity—would

exemplify the complete or partial expulsion of an infarct; while apical cicatrices would result from the gradual conversion of an infarct into connective tissue.

Aufrecht then proceeded to examine the small grey tubercles which are usually found in the neighbourhood of the larger primary foci, and to investigate the larger lobular or "acinous" foci. He approached these with the impression that the former would be found to be due to a spread of the disease in the tissues, and the latter to ejection of material from the primary focus into a bronchus, and its subsequent aspiration into the finest bronchioles. He was astonished to find no support for such views. The former he believes, largely because he found red blood corpuscles in the centre of some of them, to be sections of minute vessels, the walls of which have been extraordinarily thickened by cell-proliferation. The latter, he declares, have no relation to any kind of broncho-pneumonic process, but are due to thrombosis of smaller vessels than those of the larger foci, caused by the same kind of thickening of the walls of minute vessels. He points out also that the alveoli surrounding these areas are often quite free from disease.

The next step was to examine the lower margin of the diseased area in advanced disease, where the most recent lesions are to be found, and here he found the same process going on. But where the condition was more advanced, the alveoli were found to be affected secondarily, and to contain either swollen alveolar epithelium with leucocytes, as in a catarrhal pneumonia, or granulation-tissue as in a chronic pneumonia, or sometimes giant cells in addition to the desquamated cells. He regards the secondary desquamative pneumonia as the main agent in the destruction of the lung tissue and the formation of cavities.

In order to compare his results with the conditions in ordinary miliary tuberculosis he produced this disease in rabbits by injecting tuberculous material into the vein of the ear. Lungs, liver, spleen and kidney were always simultaneously affected, and in every case he found in the miliary tubercles the same thickening of the vessels which he had found in human phthisis. In the three last-named organs there could of course be no question of participation by air passages in the process. In the thickened walls of the affected vessels, both in the experimental cases and in human beings, tubercle bacilli were found to be present in large numbers, and to be distributed through all the layers of the wall.

The question of the primary source of the tubercle bacilli, and the way in which they enter the circulation is hardly touched on by Aufrecht, but he regards the air-passages as excluded from consideration, because no one would regard it as likely that the bacilli, which are non-motile, could pass through the bronchial

or alveolar epithelium, and through the capillaries and connective tissue, in order to make their first attack on the walls of the smaller vessels.

When Aufrecht attempts to explain why tubercular emboli should be caught specially in the vessels of the apices of the lungs, he is not so convincing. He first gives reasons why the vessels of the lungs should be specially susceptible to injury. These are, that the blood which passes through them is laden with carbonic acid, with all the products of oxidation from the tissues, and often with injurious substances absorbed from the alimentary canal. Over-indulgence in alcohol, and such ailments as diabetes, may, as the latter certainly does, act in this way, while all the influences involved in the breathing of bad air must interfere with gaseous interchange, and have a bad effect on the nutrition of the vessel walls, either directly or indirectly, by deteriorating the condition of the blood. That the apical blood-vessels in particular should be affected, he considers is due in the first place to the fact that as the inspiratory movement of the chest is largely instrumental in assisting the flow of blood through the pulmonary vein to the left auricle, the form of the chest and the action of the diaphragm must make the flow easier from the lower lobes of the lungs than from the upper, and that a sedentary mode of life, which from time immemorial has been regarded as predisposing to phthisis, will have this predisposing effect, largely by interfering with the movements of the chest. In the second place he believes that coughing, especially in childhood, and the forced respiration associated with many trades, may cause tearing, or at least weakening of the lung tissue at the apices, which are only protected by soft parts, and may predispose their vessels to tubercular mischief.

It would be the easiest thing in the world to pick holes in many of Aufrecht's statements and especially in the arguments which he uses to show why the vessels of the lungs and of their apices in particular should be specially liable to tubercular disease, but it seems to me that it is fairer to consider the main question only, and in particular first whether his observations are likely to be correct, and second, whether, if they are correct, they are capable of being used to explain the origin of all cases of phthisis.

One fact which he adduces, and with perfect accuracy, is that no one has ever succeeded in inducing in animals, by causing them to inhale tubercule bacilli, a form of lung disease comparable to the phthisis of human beings. The answer to this is, of course, that different animals react differently to the same organism, and also that there are differences in the structure of the lungs, and in the mechanism of respiration, which are the result of the erect posture.

When one examines his figures and reads his descriptions, one is struck by the fact that he seems to have paid no attention to the relation of the bronchi to his early tubercular foci. He has followed the vessels into them, but not the bronchi, and he makes no mention of Birch-Hirschfeld's observations of this kind. The cases of early phthisis observed by the latter (of the same kind as Aufrecht's) were much more numerous, thirty-two against three, and in all these cases but three he was able to trace the continuity of a medium-sized bronchus with the tubercular mass. In one of the three cases the focus was surrounded with dense connective tissue, which might have obliterated the bronchus, but the others are referred by Birch-Hirschfeld to the formation of tubercles in the connective tissue of the lung. Aufrecht's three cases may have belonged to the same category as these, but there seems no reason from his description why they might not have been bronchial in origin. Another defect in his description is that he gives us no evidence whether his thickened and thrombosed blood-vessels are arteries or veins, though he assumes them to be the former. Of course in their altered condition it would be difficult to make sure, but it would have been possible; for example, staining the elastic tissue in their walls with orcein would have given a clue. A great deal turns upon this point, because while if they were arteries his embolic theory would almost certainly be correct, if they were veins there is no reason why they might not have been thrombosed as a consequence of the tubercular growth in the tissues from which they draw their blood, and this thrombosis might quite well be a natural provision to prevent the passage of tubercle bacilli into the general circulation.

It seems to me, therefore, that until we are in possession of further facts, we must look upon Aufrecht's observations with a benevolent scepticism, especially as the embolic theory seems quite incapable of explaining the known clinical and pathological facts of phthisis. Birch-Hirschfeld's figures of bronchial tubercle are far more convincing than Aufrecht's, and even though we set aside all inhalation experiments on animals, Nocard's case, where the experimenter who was spraying tubercle bacilli on the face of an animal himself took a rapid and fatal phthisis, is fairly conclusive. The countless cases of infection running through whole families through the careless habits with regard to the disposal of sputum of the first member to be infected, could never be explained on any other hypothesis than that of inhalation. In the light of Birch-Hirschfeld's researches, there seems little doubt that in the great majority of inhalation cases the primary lesson is in a medium sized bronchus, not in the alveoli or finer bronchioles, and it seems certain that it is quite

unnecessary to postulate a pre-existing broncho-pneumonia in order to provide a nidus of devitalised tissue for the bacillus. None of the recent observers have found any evidence pointing in this direction. The tubercles which appear round the primary focus are due to aspiration of material containing bacilli from the primary foci, and bronchus after bronchus is affected, usually steadily from above downwards through the lung. It must not be forgotten, however, that tubercle bacilli can pass through intact mucous membranes, or be passed through them contained in leucocytes, or may pass through lesions of so slight a character that they are either not discovered, or are healed before the organ is examined. In these cases, which probably form a very small proportion of the whole number, tubercles may form along the lymphatic paths in the connective tissue of the lung, or appear first in the bronchial glands. In either case they may later ulcerate into the air passages, and give rise to a secondary bronchial tuberculosis, or may pass into the blood stream, or, of course, become obsolete.

Aufrecht's observations, if they are correct, are of importance in drawing our attention again to the cases of pulmonary phthisis secondary to inoculation and to pre-existing tubercular disease. Most medical men know of cases where a *post-mortem* wound or a cut finger infected with tuberculous sputum has led in the long run to death from lung disease, or where people who have suffered from tubercular glands or bones in childhood have later developed pulmonary symptoms. It has been somewhat the fashion to assume that these cases are the result of re-infection of susceptible individuals, but it seems more probable that some of the bacilli from the original lesions have escaped, probably in various ways, into the blood-stream, have been caught in the lung, and have there given rise to the set of changes in the vessels, and ultimately in the parenchyma, which Aufrecht describes. It may also be that this class of case is specially liable to initial hæmoptysis, though I know of no statistical or other evidence which points in that direction, and though there seems no doubt that hæmoptysis may occur from the spread of the original bronchial ulcer into a blood-vessel.

Why the first focus of inhalation tuberculosis should almost invariably be in the posterior part of the lung, just below the apex, in the region of the posterior apical bronchus, it is difficult to say with certainty. It is evident that it cannot be because tubercle bacilli are inhaled into that part of the lung only, for dust inhalation experiments show that fine particles are drawn into the lower and middle parts of the lungs even more freely, and as the bronchi of these parts run much more nearly in the direction of the inspired air current, it

is evident that the greater part of the bronchial tree is in some way protected from the inroads of the tubercle bacillus. The fact that a patient's sputum may for months or years contain tubercle bacilli without the lower bronchi becoming infected is in itself sufficient evidence of this. But dust experiments again show us that fine particles are removed more rapidly from the lower parts of the lung than from the upper lobe, so that in all probability the bacilli attack the upper lobe most easily because when once inhaled they are retained there longest. We have to consider therefore that in these parts of the lungs it is rather a weakness of the expiratory act than of the inspiratory act that is to blame for the non-removal of inhaled bacilli. It requires only a very superficial examination of the act of respiration to impress upon one that it is precisely in the favoured sub-apical region that the respiratory excursion is smallest, and as the apical bronchi run steeply upwards, the current of air in them is in the opposite direction to that in the trachea, at right angles to that in the main bronchus, and there must therefore be a certain mechanical difficulty in the aëration of the upper lobe which is undoubtedly favoured by the sedentary lives of the kind of people from whose ranks phthisical patients mainly come.

As the inhaled bacilli will almost always be clinging to particles of dust, it is natural to expect that they will be deposited at the point in the bronchus where the air current begins to become slow and weak, and it is therefore not surprising that the primary bronchial focus is usually in a middle-sized bronchus. It is interesting to note that in the cases where an infection of the lower lobe takes place, it is not the middle-sized bronchi which are first affected. In that part of the lung the respiratory current is too strong in them to allow the slowly growing tubercle bacilli to settle down, and one finds that it is the finer bronchioles which are affected.

To sum up, Aufrecht's observations cannot be accepted as entirely accurate and complete, and in any case only apply to a small percentage of the total number of cases of pulmonary phthisis.

SPINAL ANÆSTHESIA

By ALEXANDER MILES, M.D., F.R.C.S.Ed.
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A CONSIDERABLE amount of attention is at present being directed, especially on the continent and in America, to a method of inducing surgical anæsthesia, or to speak more correctly, surgical analgesia, by injecting solutions of cocaine

into spinal canal. Whatever the value of this procedure may be, and those who have employed it speak of it in very high terms of praise, the credit of introducing it to the notice of the profession seems to be due to Dr J. Leonard Corning of New York. As far back as 1885 this physician experimented on dogs, and obtained such satisfactory results that he felt justified in carrying out the procedure on the human subject. He began by injecting 30 minims of a 3 per cent. solution of cocaine between the eleventh and twelfth dorsal vertebræ. The needle was not introduced into the sub-arachnoid space, as it was believed that the drug would be absorbed into the venæ spinosæ and so carried to the spinal cord. As no anæsthesia resulted in six or eight minutes the dose was repeated, and within ten minutes the patient complained that his legs "felt sleepy," and there was impairment of sensibility in the lower extremities, lumbar regions, penis and scrotum. The pupils became slightly dilated, the patient was dizzy and complained of headache, but no nausea. The motor functions were not disturbed, the patient being able to walk within an hour of the injection although sensibility still remained markedly impaired. A sound was passed into the bladder without causing the patient any discomfort, although this procedure had hitherto been attended with considerable pain.

In 1888 the same observer reported his further experience of this plan and figured the trochar which he employed. Although in this and in several subsequent publications the author announced his successes, the method appears to have attracted but scant attention.

The publication in 1891 of Quincke's work on lumbar puncture of the sub-arachnoid space demonstrated the safety which attends this procedure, and awakened a fresh interest in the subject; and about the same time Mosso and Franck showed that the injection of cocaine into nerve trunks renders the area of their distribution anæsthetic. Somewhat later Sicard injected with impunity anti-tetanic serum directly into the sub-arachnoid space in a case of acute tetanus.

In April 1899, Bier injected a solution of cocaine into the sub-arachnoid space, with a view to obtaining surgical anæsthesia of the lower limbs. His success was such that he repeated the experiment in a series of cases in each of which he obtained complete insensibility to pain. He employed solutions varying in strength from 1 in 100 to 1 in 200. The patients however suffered so much from persistent headache and general malaise after the injections, that for the time he abandoned the procedure. About the same time a Russian surgeon, Seldowitch, obtained similar results.

In October of the same year, Tuffier began to employ this method, in the first case to relieve the intolerable pain of a large, inoperable osteo-sarcoma of the iliac bone. Within a few minutes of the injection of 3 cm. of a 1 in 100 solution of cocaine the patient was free of pain, and remained so for some hours. Repeated injections gave the same result, but produced some degree of headache. In another case he was able to remove a tumour of the leg without the patient suffering any pain.

Technique.—In a paper published in October of this year Corning describes his procedure at some length. The essential points are: that the needle should be from $3\frac{1}{2}$ to 4 inches long, it should be fine but not over-tempered, and the bevel at the point should be short, so that the needle need not be pushed far into the sub-arachnoid space to ensure the deposit of the fluid within the space. The escape of a few drops of cerebro-spinal fluid shows that the sub-arachnoid space has been entered. This is the only certain proof. A readily sterilizable glass syringe is used to inject the fluid. Asepsis is a *sine qua non.* A 2 per cent. solution of hydrochlorate of cocaine seems to give the best results, and from 10 to 15 minims is usually sufficient. The solution should be sterilized by boiling and allowed to cool just before being used. Legueu and Kendirdjy, however, prefer a 2 per cent. solution of eucaine as being more easily sterilized because more stable, as well as less toxic.

The patient should be seated, or placed on his side, with the body bent forward, so as to widen the spaces between the vertebral laminæ. Some prefer to inject through the space between the spines of the third and fourth lumbar vertebræ; others enter the canal at a higher level. The higher the fluid is injected the greater is the length of the cord brought under its influence. Should any difficulty be experienced in entering the canal, the needle should be withdrawn and introduced at a different point.

After injecting the fluid the needle should be left in position till anæsthesia ensues, so that the puncture in the membranes may remain plugged and prevent the escape of the solution into the tissues around the spine (Bier). This surgeon anæsthetises the track of the needle by Schleich's infiltration method—an apparently unnecessary procedure.

Effects.—In from five to eight minutes after injecting the fluid the patient complains of numbness and formication in the inferior extremities—"the legs feel sleepy"—and a few minutes later anæsthesia ensues. Sometimes the anæsthesia comes on much more rapidly, and it has been found possible to dilate the sphincter ani—undoubtedly a very painful procedure—within two minutes of injection. The anæsthesia lasts from half an

hour to several hours, the period being very variable, but nearly always sufficiently long to enable an ordinary operation to be carried out before it passes off.

The extent of the anæsthetic area is also very variable. Speaking generally, the higher up the cord the drug is injected the wider is the field of anæsthesia. In some cases, however, sensation has been lost for a considerable distance above the level of the injection. In the higher reaches of the cord, moreover, the anæsthesia appears to be more transient and does not last long enough to enable prolonged operations to be completed without pain.

In addition to occasional failure of the injection to induce anæsthesia, rendering it necessary to have recourse to a general anæsthetic, the only untoward symptoms recorded are vomiting, headache, and elevation of temperature.

In two out of fifty-seven cases Legueu and Kendirdjy had to administer chloroform before the operation could be proceeded with—one a case of appendicitis, the other that of a woman on whom it was necessary to perform vaginal hysterectomy. In about one-third of their cases there was vomiting, but it was never serious, and the patient is usually able to take food immediately after the operation. The severity of the vomiting does not appear to bear any direct relation to the dose of cocaine injected.

Headache is a more frequent symptom, but it is seldom severe or long continued.

Elevation of temperature, apart from any septic complications, was observed in 12 out of the 55 cases.

The anæsthesia resulting from the injection is absolute. It is, to speak correctly, analgesia which results, the patient retaining ordinary sensation, but losing all sense of pain. He, of course, remains quite conscious of all that is going on. In certain operations this is an advantage, as for example in hernia operations, or operations for piles, where the patient can aid the surgeon by straining. In intra-peritoneal operations, however, the tension of the muscles of the abdominal wall is a great disadvantage. Other objections to performing extensive operations on a perfectly conscious patient are obvious.

Those who have employed the method, lay much stress on the absence of after effects, so that so soon as the operation is over the patient is comfortable and free from the distressing nausea, sickness, and thirst which so frequently results from general anæsthesia. It has been found that patients who have had the experience of being operated upon under both forms of anæsthesia, prefer the spinal method.

Operations in which the method is available.—Legueu and

Kendirdjy give a list of fifty-seven operations in which this method has been employed. It includes the opening of abscesses and bursæ in the leg, the setting of fractures, radical cure of hernia and appendicitis, various operations on the testes, epidymis, tunica vaginalis and urethra, piles, and different gynecological operations, such as curetting, perineorrhaphy, and vaginal hysterectomy.

Tuffier has also employed the method extensively (210 cases), and has found it useful in genito-urinary, rectal and abdominal cases.

Marx gives notes of twenty-three cases in which he has employed it in labour. He finds the anæsthesia lasts for from one to five hours, and that serious complications have never manifested themselves. Such symptoms as nausea, vomiting, headache, perspiration, and elevation of temperature he has met by the administration of $\frac{1}{100}$th gr. of nitro-glycerine with morphia, or better still, by $\frac{1}{200}$th gr. of hydro-bromate of hyoscine.

The labour may be conducted without pain by repeated injections, beginning when the os is three-fourths dilated. He considers the procedure devoid of danger alike to the child and mother.

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OBSTETRICS AND GYNECOLOGY

By J. W. BALLANTYNE, M.D., F.R.C.P.Ed.,
Lecturer on Midwifery, Medical College for Women, Edinburgh

Curettage of the Uterus.—There is a tendency observable in recent obstetrical literature to recommend the use of the finger rather than the curette in cases of abortion. F. A. Stahl (*Amer. Gynæc. & Obst. Journ.*, xvii. 315, Oct. 1900), at anyrate, strongly prefers curage (scraping with the finger) to curettage, and he gives notes of three cases of abortion in which the finger seemed to possess advantages which the curette did not. In one of these cases the finger was able to recognise, and easily and safely to remove, a piece of sponge tent which had been

used (unknown to Stahl) to induce the abortion. Indeed, the finger can recognise much better than the curette the position and nature of a foreign body in the uterus. Further, it has a superior power of shelling out decidual remnants, and in another of Stahl's cases, he was able to loosen with the finger some membranes which were then spontaneously expelled. It has been objected that the tip of the finger cannot always reach the fundus uteri; but on the other hand it is rare for the tip of the middle finger not to reach this point, especially if the operator's other hand be used to depress the uterus through the abdominal walls. Again it has been stated that curage is more painful than curettage on account of the greater degree of dilatation of cervix and vagina that is necessary, but even if this be so it matters little, as the patient is generally put under an anæsthetic. Further, there is some satisfaction in feeling that the uterus has been completely emptied. F. Caruso (*Archivio di ostetricia e ginecologia*, vii. p. 577, Oct. 1900) writes also on the use of the curette; but he, unlike Stahl, wishes to extend rather than to narrow its field of usefulness. He has now performed induction of abortion (therapeutic fœticide) in two cases by means of the curette. In both of these, the indication for the induction was hyperemesis gravidarum, but in one there was the additional necessity arising from the presence of phthisis pulmonalis. The cervical canal was dilated rapidly by metal dilators under chloroform, and with the curette and ovum forceps the uterus was quickly cleared out. In a few hours the vomiting ceased and did not recur. The pulmonary condition was not, of course, in any way altered or ameliorated. Caruso gives a list of some thirty-seven cases in which abortion was induced by means of curettage, and in none of these had a mother perished. In most of these the indication had been uncontrollable vomiting, but exceptionally it had been phthisis, or grave pelvic contraction, or syphilis, melancholia, hystero-epilepsy, or septicæmia. Compared with some of the procedures which have recently been lauded, such as the introduction of iodine, of glycerine, or of solid nitrate of silver into the pregnant uterus, it possibly may have advantages; but there is something to be said for the older and slower procedures. At the best, the forced, extemporary induction of abortion always carries with it a risk, and ought never to be undertaken without consultation. The slower dilatation of the cervix followed by the use of the finger rather than of the curette will commend itself to most gynecologists and obstetricians in this country. At the same time the absence of maternal mortality in Caruso's list of cases is striking.

Notes

BRITISH CONGRESS ON TUBERCULOSIS.—The British Congress on Tuberculosis in London will be opened by the Prince of Wales on Monday, July 22nd, 1901, and will be continued on the following days of that week. The Congress will have four sections — Pathology, Medicine, State Medicine, and Veterinary Medicine—which will meet on the mornings of Tuesday, Wednesday, Thursday and Friday, and Saturday will be devoted to excursions. Further particulars can be obtained from the Honorary Secretary General, 20 Hanover Square, W. The subscription for Members of the Congress will be £1, which will include a copy of the *Transactions*. A fund is being formed to defray the expenses connected with the Congress, which must be considerable. It already amounts to £800, but at least five times this amount will be required.

ROYAL COLLEGE OF SURGEONS, EDINBURGH.—The following gentlemen, having passed the requisite examinations, were, at a meeting of the College held on 17th inst., admitted ordinary Fellows:—Francis Wesley Broadbent, M.B., C.M., Leicester; Thomas Davies, L.R.C.S.E., Sydney, N.S.W.; Harry Edward Gibbs, M.B., Ch.B., New Zealand; Charles Cowen Gurd, M.B., M.R.C.S.Eng., Montreal; Charles Harold Johnson, M.B., C.M., Melbourne; George Alexander Reid, M.D., Bournemouth; Walter Henry Skinner Stalkartt, M.B., C.M., Portsmouth; Edgar Somerville, M.B., Ch.B., Leek, Staffs.; and John Brown Yeoman, M.D., Neston, Cheshire.

DR UNNA'S DERMATOLOGICAL LABORATORY IN HAMBURG.—On 1st January 1901 Dr Unna's dermatological laboratory, which has hitherto been connected with the Klinik, will be removed to new premises and will be enlarged and made suitable for more extensive courses of instruction.

There are to be two courses in the year of six weeks each from the beginning of February to the middle of March, and from the end of September to the beginning of November, during which Dr Unna and a large staff of assistants will conduct demonstrations in the Laboratory. The subjects taken up will include the anatomy, physiology, pathology, experimental pathology, microphotography and the hygiene of the skin, as well as the diagnosis, treatment, pharmacotechnique, macrophotography and history of skin diseases.

Through the whole year investigators may obtain places in the laboratory for work on skin diseases, while such workers, as well as those attending the courses, will have free access to Dr Unna's Poliklinik and Library.

CALEDONIAN MEDICAL SOCIETY.—*Gunning Celtic Prizes.*—Through the generosity of His Excellency the late Dr R. H. Gunning, the Caledonian Medical Society have the good fortune to announce two prizes, of the value of twenty pounds and ten pounds respectively, for essays on some Celtic subject—Ethnological, Historical, Philological, or Medical, under the following conditions:—

1. The essays shall be written in English.
2. The competition for these prizes shall be open to all comers.
3. Within the range of Celtic subjects indicated above, competitors will be allowed perfect freedom in choice of subject. The Committee suggest the following as suitable titles:—
   (*a*) "Ancient Medical Manuscripts—Gaelic or Irish."
   (*b*) "The Origin, Language, Social Habits, and Traditions of the Insular Picts."
   (*c*) "The Influence of Scenery and Climate on the Music and Poetry of the Highlands."
4. The judgment of the Assessors and Sub-Committee shall be final.
5. The successful essays shall become the property of the Society, and shall be published in the *Caledonian Medical Journal.*
6. Essays sent in competition shall bear a motto only, the name and address of the writer to be enclosed under seal.
7. Essays to be sent under cover to Dr Rutherford Macphail, Honorary Secretary, Caledonian Medical Society, Rowditch, Derby, by 1st January 1902, endorsed "Celtic Prize."

NOTICE.

All communications to the Editorial Department, including Exchanges and Books for Review, should be addressed to THE EDITOR, Dr W. RUSSELL, 3 *Walker Street, Edinburgh, and all business communications, including Subscriptions, Advertisements, &c., to* THE SUB-EDITOR, Dr NORMAN WALKER, 7 *Manor Place, Edinburgh.*

THE SCOTTISH
MEDICAL AND SURGICAL
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PRESIDENTIAL ADDRESS

ON

THE RELATION OF DENTISTRY TO MEDICAL EDUCATION

Delivered to the Aberdeen Medico-Chirurgical Society

By W. H. WILLIAMSON, M.D., L.D.S.,
President of the Society

AS you may have already surmised, the narrow field to which I invite you this evening, is that specialty called dental surgery or dentistry, which it has fallen to my lot in life to practise, and which to many a medical practitioner is more or less of a *terra incognita*, because, for many reasons, he passes without having paid any attention to this particular branch of the healing art.

The student will say that it is not his intention to become a dentist, and that, as dentistry is nowadays a distinct profession, with training schools of its own, there is no occasion for him to concern himself with its theory or practice. This statement seems at first sight plausible enough, but it is really only a half truth—that most dangerous and misleading method of expression. It will be at once admitted that if he is going to practise medicine, he will not therefore practise dentistry, but the weakness of the position lies in the complete ignoring of the value of even a slight dental knowledge, which, I may say at once, I deem essential to a complete and successful practice of medicine. Of course this knowledge will be of most value to those whose field of practice is in the country or abroad, whether on land or sea, but it also applies, of course in a lesser degree, to the general practitioner in our large towns. Although the number of so-called specialities are on the increase on account of the enlargement of the boundary of

knowledge already referred to, yet that fact does not absolve the ordinary practitioner from the necessity of obtaining a certain knowledge of the main features of the diseases of such parts as the eye, nose, ear, or throat, so that when a case affecting any special part comes up in the course of practice, he may recognise its due significance, and he will probably be able to treat it himself if simple, but if it possesses features which he does not fully understand the relations of, he will refer the patient to the specialist.

The mere fact of specialism being on the increase is apt to make us forget that this body of ours is a mass of correlated parts, that a certain action and reaction take place between them all, and that the great problem of modern medicine is to form a just estimate of the way in which pathological conditions affect the relation of part to part, and without which, no one can become a successful discoverer of the *fons et origo mali.*

The human body requires a man to possess the broadest possible outlook, for narrow conceptions will often lead his judgment astray. Why, then, should all the parts of the body be studied in this way with a view to general practice, but not the mouth with its contained organs of mastication, on the efficient use of which depends so much the health of the whole body; and not only that, but these useful organs the teeth are in these degenerate days the most common subject of pathological conditions. You will find in almost any mouth, that has not been well cared for by a dentist, numerous instances of caries in its various degrees of progress: disintegration, softening and whitening of the enamel going on to softening of dentine, exposure of the dental pulp, and then the various inflammatory stages ending in complete gangrene and finally causing abscess by its septic condition.

The modern developments of bacteriology have added new terrors to our existence, but at the same time, we are furnished in some measure with the means of combating the ever present germ. The mouth, with its blood-heat temperature, forms a splendid incubating box for hosts of bacteria, pathogenic and non-pathogenic, aerobic and non-aerobic, the last named being found in the deeper layers of carious dentine. The pneumococcus not unfrequently found in the mouth is supposed frequently to be the source of infection in cases of septic pneumonia.

It is believed now also, that the numerous cases of enlarged tuberculous glands of the neck owe their origin to the entrance of the tubercle bacillus by way of defective teeth in the mouth.

At the annual meeting at Ipswich this year a case was brought forward by Dr William Ewart of malignant ulcerative endocarditis, where no probable cause could be discovered except in the septic condition of the mouth, and the discussion that followed only tended to confirm the supposition that cases previously classed as idiopathic were really cases of dental or perhaps more correctly, oral origin.

Also, the various ferments produced by bacteria may have an important effect in the causation of dyspepsia, and this may be one of the reasons why these cases are so intractable where the mouth has not been put in a thoroughly healthy condition. Witness in many cases the great improvement in health where a number of diseased roots have been removed, and that improvement taking place before the introduction of artificial substitutes.

I will take it now for granted that you admit the frequency with which dental cases crop up in private practice, and that it is desirable that the general practitioner should have a certain amount of knowledge of the subject, which, in the present state of medical education, he hardly ever receives. In spite of the extension to five years, the medical student still seems to find time too short to obtain even a smattering of dentistry.

What remedy, then, can be proposed to supply this dental education to students of medicine? First of all we must recognise the necessities of the case and encourage students to obtain this special knowledge, even although in doing so, stereotyped methods may have to be eschewed. The old order of medical education is fast changing and the tendency is for the laboratory and the bedside to supplant the ordinary lecture, the substance of which may, for the most part, be obtained in the standard text-book. The course I used to give in the Infirmary, consisted of about a dozen lectures illustrated principally by such models as I show you, which are much more of a teaching character, or, I may express it, as more of a clinical character, than any diagram could possibly be. The models shown are plaster ones, principally with the natural teeth inserted, and the gum tinted realistically, so as to show effects

of irritation, etc. They were made by my father, who, I believe, was the first to use this method in dental education. Then there were two or three meetings where members of the class served as patients for demonstration.

For some time back I have thought that the number of meetings could be reduced by a half, and that from four to six would be sufficient, consisting principally of demonstrations, with a certain amount of what may be called lecture on points that do not admit of actual demonstration. I proposed this to the Infirmary committee some three or four years ago, as they were desirous of improving the facilities for dental instruction, but it led to nothing, as, of course, it was contrary to precedent that such a short course should be given, and the ordinary guinea fee might be thought too much for even a *multum in parvo*. Then it would also be undesirable to charge less or even charge nothing, so that between these various stools, the proposition, though regarded as reasonable in itself, could not be carried out, owing to the practical difficulties of the nature indicated. Students will always readily go to practical classes for eye, ear or throat, skin, etc., as the various diseases of these organs bulk largely in actual practice, and considerable amount of time and study is required to cover the whole ground, for I am supposing that the general practitioner should be fairly well acquainted with the main features of these specialties.

But dentistry stands on a different platform; it is practised by a different profession; the most part of a proper dental course is taken up with the consideration of the various practical methods used for the conservation of the teeth; and it seems to me that there are just a few points or tips—if I may use such a vulgar word—which are of direct interest and value to the medical practitioner, and which would form the substance of the abbreviated course I have referred to.

Take, for example, the simple, but yet very important point of the examination of the teeth, not unfrequently attempted by doctors for the purpose of ascertaining the cause of facial neuralgia, which in ninety-nine cases out of one hundred is of dental origin. A general glance of the opened mouth is taken, and, if there is no blackness or distinct hole to be seen, the verdict is that, as the teeth seem sound, therefore they may be excluded from the list of causes.

This superficial idea of what constitutes an examination leads to many errors of diagnosis. Very early in practice, I remember a case of a lady who had been under the care of a very deservedly celebrated London consultant, who is cited in one of our dental books as having been remarkably acute in diagnosing obscure cases of dental disease. The patient was suffering from neuralgia and her mouth was in due course examined, but as no cause was discovered there, she was put on a course of some antineuralgic, which did her no good. It would seem just at first sight, when she opened her mouth, that it was a very simple matter to tell whether her teeth were the source of trouble or not, for on the affected side, on the lower jaw, at any rate, there was but one solitary molar coming pretty well forward, which had quite a good, sound-looking appearance, but on pressing the cheek away with the finger, a large cavity was disclosed on the outside, with an exposed pulp at the bottom of it. An arsenical application cured in a couple of hours a painful affection of some two months' standing.

Another instance occurred to me a few months ago, of a girl of about twenty, who came to me suffering from neuralgia. On inspection, it was at once evident that her teeth were in a very bad condition, there being hardly a sound tooth behind the canines above or below, in all stages of disease, some with pulp exposed, most with dead pulp, and some of the roots almost entirely covered by fungus growths of gum—an evidence to a dentist of long-standing disease; and yet this condition had not been recognised by the medical man consulted, who bears an excellent reputation, and is of the modern school. He had occasion afterwards to write to me in reference to the case, and I give it as an instance of what is not uncommon, owing to the casual attention that dental matters obtain during the medical curriculum. He writes as follows:—"As far as I remember, when she first consulted me about neuralgia in the end of last year (that is about five or six months before her visit to me), I examined her teeth, and if there were anything wrong then, the condition must have been slight or I should have noticed it. I am quite certain that I examined her throat and nose, eyes and ears, so I cannot have omitted her mouth, as I usually do that first, so that her teeth must have gone rapidly." Then he goes

on to say, "Her general health has been very poor for some time, her appetite miserable, and I fancy the teeth have been the chief cause."

This extract is, I think, particularly interesting and instructive, because it illustrates the excellencies and the defects of modern education. You will observe that he is quite certain as to examining various organs, probably using the ophthalmoscope, rhinoscope, otoscope and laryngoscope, because he has been trained to the use of them, and his memory will readily recall the result of his systematic examination.

But the dental examination which in such a case should be the most minute and searching of the whole had made no definite mental impression, for after the statement of certainty in regard to the various other organs, he proceeds, "so I cannot have omitted her mouth, as I usually do that first"; so you see theoretically he is a most correct, up-to-date, and painstaking physician, who begins with the probable cause, and ends with the less likely. There is a little fly, however, which destroys the efficacy of the whole pot of ointment, and that is the absence of the simplest dental education; for it is evident that, if the examination of the mouth had been conducted with the same care and scientific exactitude as the rest, the cause or causes of the neuralgia could not have escaped observation. It is not sufficiently recognised that it is not enough to open the patient's mouth and, without the use of mirror or probe, to look them over and give a positive opinion as to their condition. Even dentists very often omit to notice cavities from neglect of being systematic in examining all the surfaces of the teeth. The enamel is often apparently sound, but the practised eye will detect that creamy whiteness which indicates a cavity underneath; but on the approximate or touching surfaces of teeth of middle-aged people, where the cavity is often at the edge of the gum, this visible sign is absent and only by means of a curved probe can it be discovered.

I remember once a little incident which impressed me, and which occurred in a dental office in an American town, where I happened to be one day many years ago. A labouring man came in complaining of severe toothache; the dentist examined his teeth and could find nothing to account for it, so, in the free and easy manner of America, he handed over the probe

and mirror to me to have a trial. The teeth looked apparently sound, but, when I happened to press the probe well under the gum, it slipped into a concealed cavity in a molar, which was the cause of the whole trouble. Another instance may be adduced where a dentist had very carefully excavated a central cavity in a molar, supposing it to be the source of neuralgia of which the patient complained, when it really proceeded from an exposed pulp in a concealed cavity in the adjoining bicuspid tooth.

If, then, the very elect are thus sometimes deceived, how much more likely is it that the ordinary non-instructed medical sinner should fall into error in these cases?

But there is another aspect that the family doctor is often consulted about, and that is in regard to the teeth of children—the order of the first dentition and the common problem of which are first and which are second teeth, in reference either to decay or to an irregular condition. Whenever I had the opportunity of asking questions of students in regard to cases of children from six to thirteen, I did so, with very remarkable results, the right answer in regard to a particular tooth being rarely reached till about the fourth or fifth guess, and that arrived at by a process of excluding the wrong answers. When he enters practice he will be asked similar questions by many a fond mother, who will perhaps not regard him as so definitely skilled as a dentist, but still will view him as a sort of superior intelligence, whose training has all been for the purpose of learning the various mysteries of the human body. The mere looking at the forms of the teeth ought to be sufficient, but the doctor will probably in the circumstances need the extraneous aid of his finger, so that by the subtle sense of the *tactus eruditus* he may ascertain their comparative stability, pronouncing the shaky ones, first teeth, the firm, second teeth, and those between the two extremes as doubtful.

A senior practitioner told me that he had known of several cases of young men entirely losing the confidence of mothers who had asked them in regard to the order of the first dentition of which they were ignorant.

But it is a great pity that this state of matters exists, for the doctor would find it to his advantage to know something of children's teeth, and to be able to say whether it is desirable

that a visit should be made to the dentist or not. He should be able to distinguish, for example, the permanent six-year-old molars from the temporary molars, as, from want of knowledge, the former are often prematurely lost, owing to their being reckoned as first teeth. Then there are a number of points in connection with the eruption of the second set that it is advisable to have some knowledge of; whether, for instance, it is desirable to allow the second to come into place with or without interference.

Here is one of the most common instances where dentists are consulted, and where the rule would be to do nothing and let nature have its way until the age of twelve or thirteen is reached, when it will generally be found that there is no occasion to interfere. It is the appearance of the lower lateral incisors in a place posterior to the others, and where the parent generally expects that the temporary tooth, or teeth, will have to be removed in order to give room.

A case occurred the other day when, at the mother's suggestion, a doctor in a country town had taken out both temporary lateral and canine, the consequence being that the incisors had too much room, owing to the growth of the alveolus; and the permanent canines, which come in several years later, were left with too little room. In the case of the upper jaw, again, if an incisor erupts behind, it is locked in that position by the lower teeth, and it is best to remedy it as soon as possible, as it will never come right of itself, and the younger the patient, the more easily can it be moved out to its proper position.

I think one reason why the student at the end of his course knows so little about the teeth is that at the very beginning of it he makes his first and last acquaintance with them, along with the bones. These latter he retains a fairly good idea of, because his attention is being constantly directed to them in the further study of anatomy and in the theory and practice of surgery; but his knowledge of the teeth, although they are to be found in almost every patient's mouth, becomes vague and useless, simply because attention is never directed clinically to them, it being a matter of nobody's business to do so.

I do not know how students are taught the subject nowadays, but it is probable that it is very much as it used to be in my time, when the late Sir John Struthers (who himself never

lost an opportunity of advising the student to pay attention to dentistry), or the demonstrator, supervised the studies of the bones. A few separate teeth were put out for us to count the number of their roots and cusps, and we could regard them *in situ* in the glass cases of the famous museum. Now such learning is not of much benefit, because, never being exercised afterwards, it soon fades away, as there is no association of ideas connected with the teeth as with the bones.

In our dental schools a good deal of teaching is done by demonstration on a dummy skull, with upper and lower jaws, which have grooves in them filled with plaster and the teeth imbedded in it, and the cheeks represented by a strip of thin indiarubber sheeting on each side. This is used for the practice of various operations on the teeth, filling the teeth and roots, putting on crowns, bridges, etc., also for demonstrating the operation of extracting, with the proper position of the hands and fingers of the operator, etc.

Such a dental dummy would be a very useful adjunct in the dissecting-room, because it may be used to give that form of instruction which is wanting.

Instead of plaster I would suggest that the grooves be filled with a modelling composition, which, dentally, we know as moldine, but which somebody has got hold of in this country and sells as plasticine, an excellent substitute for modelling clay as it does not get dry, and it does not dirty the fingers. In this, the student should arrange the teeth in their proper order and position, taking the first and second dentitions separately. Then might come the exercise of arranging according to age, with the gradual displacement of the first by the second, and, by thus presenting the teeth of both dentitions, the student would have a much more intelligent idea of the differences between them and the order of succession than he could possibly obtain by the ordinary method.

It would also be of great advantage if the student at this stage learned something of the ordinary operation of extraction, for the reason that, the forceps being made to fit the teeth, the observation of the anatomy of the forceps, coupled with the corresponding anatomy of the teeth, will serve to impress the connection of the two and prevent those gross mistakes in using the proper instrument that one so often sees the

student commit. You will see him, for example, after reading the description of the instrument on the inside of the handle say, a right upper molar, proceed to apply the outer blade to the inner side and *vice versa*. If he has been thoroughly taught in the way suggested, he will look at the shape of the blades and not at the inside of the handles.

Now, this line of thought having led me to speak of the operation of extraction, I would here emphasise the great importance and advantage of every medical student having a certain amount of experience in its proper performance. A practitioner in a large town may look lightly upon it as it is an unnecessary accomplishment for him, but to one in the country or abroad, or in the army or navy medical service, it is a very serious loss to himself and to his patients if he is not able to extract teeth reasonably well. You will find many a country doctor who shirks the doing of it just because he had no experience before he commenced practice, and, his first essays not being particularly successful, he avoids it as much as possible, the consequence being that the chemist of the place reaps a rich harvest. You will find it a universal testimony of country practitioners that they have found this practical knowledge of the greatest service to them, contributing largely to their success. And it is no wonder, for among the poorer classes nothing is so common now-a-days as toothache, and, as in the treatment of other diseases, the doctor should be capable of profiting by being able to relieve their sufferings. I can recall a very amusing instance of how the operation can be avoided, and it was related by a Highland student who read a paper to the medical students' society of the day on his experiences as surgeon on board an Arctic whaler, and in those days, a second or third year's student was often taken in that capacity.

One day a man came to him in great trouble with one of his teeth which he wanted out. It was his first case, and so he carefully inspected it with fear and trembling, after which he proceeded to say that it would be necessary first of all to lance the gum. So he opened the case containing the instruments for amputation and carefully selected the largest knife of the lot, the result being that, when he turned round again, he was just in time to see the sailor's legs disappearing through the cabin hatchway.

It seems to me, too, that the simple operation of tooth extraction is one of the best introductions to the practice of surgery, either minor or major, because it requires some little nerve and steadiness, and accustoms the operator to the manner of dealing with and controlling patients.

Examination of the teeth has been already referred to, but it is specially important when extraction is to be performed, as the patient is not to be depended on for reliable information on the point, although often extremely positive. We are all familiar with the fact that an early symptom of hip-joint disease is pain felt at the knee; but, somehow or other, in the mouth, the knowledge of the fact that pain is often radiated along another branch of the trunk, and is not felt at the point of origin, is often forgotten. A root is blamed where a tooth with exposed pulp some little distance away is at fault, or pain originating in a wisdom tooth is referred to a bicuspid or incisor, or a tooth in the upper is blamed instead of the lower, and *vice versa*.

Just the other day I saw the case of a lady where carbolic had been applied to the gum between a sound upper molar and the bicuspids, whereas the true source was a cavity at the back of the lower second molar, which was never discovered. In a case like this, of a patient at a distance from a town, how useful it is for the doctor to be able to apply properly either a carbolic dressing, or preferably an arsenical application, to the pulp, this latter preparing the way for the dentist's operations and saving a journey.

One of the most ludicrous instances of helplessness in dental cases was furnished some years ago by a doctor who had been acting as surgeon on board the P. & O. steamers. He was telling me some of his experiences in that way, and he mentioned that he was in the habit of using carbolic acid in toothache cases, but he added, "I managed well enough with lower teeth, but had a good deal of difficulty in applying it to the upper teeth." "Oh! how was that?" I asked. The murder was out, when the explanation was vouchsafed that he poured the carbolic from a bottle, and the puzzle had been how to overcome the force of gravitation in the case of the upper teeth.

There is another important point about which there is often

haziness of idea, and that is, the distinction between the toothache caused by an exposed pulp and that caused by inflammation of the root membrane, the treatment being, of course, entirely different. When an alveolar abscess is developing, it is by no means an uncommon error for a doctor to advise outside poulticing, the consequence being external fistula, leaving more or less of a scar on the face, according to the length of time it has been allowed to remain untreated— that is to say, the offending tooth or root not having been removed. When this, however, is done, it is astonishing with what rapidity the sinus heals up without any further treatment whatever, but in cases of important teeth the cure may be effected by treatment of the root. These openings are often supposed to be connected with dead bone, especially when, for example, they appear in the roof of the mouth, the source being generally from the lateral incisors, or under the chin from the lower incisors or canines.

Then, again, in the upper jaw you have the important relation of the teeth to the antrum, and the frequency of antral empyema from this cause.

And now, having indicated some of the more salient points of dental surgery in relation to general practice, I am conscious that I might have said much more, and referred to other points, such as the administration of nitrous oxide, which in many towns in England especially, is administered by general practitioners for dentists, although, personally, I do not consider it of much advantage to have a separate administrator; of course I am referring to the ordinary administration where no more gas is given after the facepiece is taken away, but now there are various devices by which gas is continued either by a tube in the mouth or by a nose-piece, and in these cases an administrator is absolutely necessary.

It is therefore very desirable that the student should acquire a knowledge of the administration of this anæsthetic, and also of gas and ether, useful alike in dentistry and in many cases of minor surgery. As for chloroform, in spite of the warm advocacy of its adherents, I think that it is being more and more eschewed, in dental cases at least. It has always seemed to me that the facility and ease of its administration have been given an undue prominence in the argu-

ment, and the extra trouble of ether inhalation unduly exaggerated.

As to relative safety there cannot be the least doubt, and as in the administration of an anæsthetic the life of the patient ought to be the principal consideration, it would naturally follow that ether should be the general rule, in spite of its comparatively slight disadvantages in regard to ease of administration, etc.

Fortunately, however, in a good class dental practice, it is hardly ever necessary to use what may be called a major anæsthetic, and the cases that do require it are generally those that have never previously sought dental aid, except, perhaps, in a time of dire necessity.

I mention this fact for a particular reason, because I do not wish that you should carry away with you, in consequence of the stress laid upon it in this paper, that extraction is the most important operation in dentistry, and that it is the end all and be all of a dentist's existence. It may be well to remind you that, although the whole art of conservative dentistry is practically the outcome of the last fifty years of this nineteenth century, yet the advance has been rapid and has kept pace with other departments of the healing art. Science has in many instances discovered that what were reckoned as waste products of manufacture may be converted into mines of wealth. So by means of better pathological knowledge and the intelligent appreciation of antiseptics and antiseptic principles, many teeth and roots are now restored to full function which previously were consigned to the tender mercies of the forceps as utterly useless and detrimental to the general health of the mouth. A root restored to a healthy state and completed by an artificial crown of either gold or porcelain forms in most cases as perfect a restoration of natural conditions as it is possible to achieve, and so the once despised root has thus become of the greatest value when the question of artificial substitutes has to be considered.

What is called bridge work is an extension of crown work in order to fill vacant spaces, but, unless it is used in really suitable cases, the ultimate result is often not satisfactory, at anyrate not sufficient to compensate for the injury done to

sound teeth that are used as the anchorages, piers or supports of the structure.

Coincident with all these advances in practice, the profession has assumed greater proportions, and its position is more definite. In 1860 the Royal College of Surgeons of England instituted the Dental Licentiateship or L.D.S. degree, which, since the passing of the Dentists Act of 1878, has become, so to speak, the hall-mark of a qualified dentist. True there are a great many really unqualified men on the register, but that is owing to the fact that all who, at the passing of the Act, simply averred that they practised dentistry in any shape or form, were entitled to registration, a state of things which time only can remedy. Besides these, there are a great multitude who, under the title of a company, call themselves dentists, or singly, under various circumlocutionary titles, carry on dental practice of a sort.

The public unfortunately have in consequence very peculiar ideas as to what constitutes a qualified dentist, and medical practitioners share in this ignorance, a fact which tends to hinder true dental progress. But in spite of all hindrances, we look forward to the future with hope and confidence because we are young, and because also we see that the origin of the whole art of medicine and surgery is really but a thing of yesterday. There is also the feeling that the medical profession is beginning to realise that a healthy state of the mouth is of primary importance for the health of the individual, and that the health of the individual means the health, wealth, and prosperity of the nation. Although often discussed by dentists, the statements made last year by an Aberdeen graduate, Dr James Cantlie, as to the prevalence of dental disease and its effects on the general development, seemed to come as a surprise and a revelation to the medical profession, who formed a committee of investigation on the spot. And although it may be doubted that the immediate result may be of any great moment, yet it paves the way for that hearty co-operation between dentist and doctor which alone can produce that consummation devoutly to be wished for, the amelioration, or, better still, the prevention of dental decay.

CLINICAL LECTURE

ON

PULMONARY PHTHISIS AND ITS TREATMENT

Delivered in the Royal Infirmary, Edinburgh

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(*Continued from page* 47)

THE prognosis in phthisis can be best considered under the following heads :—(1) Conditions of heredity ; (2) Conditions which have led to the development of the disease ; (3) General condition of the patient ; (4) Condition of the lungs ; (5) Complications.

(1) *Conditions of heredity.*—Under this head we look, not only for a family history of phthisis, but for such diseases as rheumatism, kidney disease, diabetes, asthma, epilepsy, etc., in fact, for any condition which betokens a lowered nutritive power, and the less of this we find, the better is our prognosis. We have to remember also that double heredity is worse than single, that in families the younger members are as a rule more likely to suffer from bad heredity than the elder, that a transmission from father to sons, mother to daughters, can often be recognised, and whether this has occurred or not, that those members of a family which more resemble the feeble parent in physical conformation are precisely also those more prone to bear a resemblance as regards liability to disease.

(2) *Conditions which have led to the development of the disease.*—Under this head it may be taken as a rule that the more unfavourable the circumstances have been, the better chance has proper treatment of procuring an arrest in the phthisis, and the greater the possibility of permanently improving the circumstances, the greater the possibility of permanent recovery. It can be readily understood also that a phthisis which has supervened after a severe exposure to cold or wet will be better prognostically than one which has, as it were, come on of itself.

(3) *General condition of the patient.*—The better this is, the better the prognosis, and under this head the most important feature is fever. Fever, with its attendant impaired appetite, digestive and assimilative powers, its loss of flesh, and physical

weakness, is always of somewhat grave omen. Specially so, however, is this the case, if after some days of rest and treatment it does not abate or improve.

(4) *Condition of the lungs.*—Here it must first be stated that an early involvement of both apices indicates a rapid course, and conversely that in the very chronic examples of phthisis, the limitation of the disease to one lung, is a characteristic. In practice it is quite common to see a patient with one lung almost completely destroyed show very little change for the worse year after year; and it is as common to see other patients with disease at both apices so slightly marked as to be hardly detectable, rapidly lose ground, and die within a year. The question may be asked—How much of a lung may be involved, and yet absolute healing remain possible? We cannot answer this precisely, for we cannot, to begin with, be sure in any individual case how much of the lung is really destroyed. In order to determine the possibility of complete healing, it is in most cases best to wait for re-examination after a period of six months or a year.

(5) *Complications.*—In phthisis these add enormously to the gravity of the disease, and notable amongst those are tubercular involvement of the larynx and tubercular enteritis. In cases of appendicitis, fistula, and enlarged cervical glands occurring in the phthisical, or suspected phthisical, the question of the advisibility of an operation often presents itself. I confess to a great share of the hesitation which the old physicians had in advising operation in those circumstances. I have seen several cases in which rapid extension of lung disease followed operation for appendicitis in the phthisical, and in most cases of enlarged tubercular glands in the neck I am decidedly in favour of rest, sunlight and fresh air, as compared to excision. On the other hand, if the tubercular complication is setting up much irritation, and thus lowering the general health, operative interference may do very great good; as, for example, in kidney tubercle, or in tubercular peritonitis. The amount of good to be anticipated from operative interference must be considered in each individual case. We have, as it were, to balance against one another, the amount of irritation caused by the complication and the amount and seriousness of the lung disease.

We are led to the idea of the Treatment of consumption if we realise that in the big broad sense consumption is one of the sacrifices which humanity has to pay for the benefits of an advanced civilisation. Advanced civilisation means the bringing of numbers of men together, as it were, under one roof. Thereby the air is rendered less pure, the freedom of movement of body and of lungs is curtailed, the sunlight is more excluded.

The idea, therefore, is to put our consumptive patient, as it were, back in civilisation; to put him in surroundings where humanity is sparse, where air is pure, where freedom of movement, of body, and of lungs is as absolute as possible, and where sunlight is abundant.

In a considerable proportion of cases this can be done, and all of us can point out examples of individuals, living and healthy, in the more favoured lands of Africa, America and Australia, who owe their lives and health to this change. Unfortunately, however, there is a large number of people for which this remedy, in all its strong simplicity, is not fit. These are: (1) Those who, mainly as the result of bad surroundings, have lung disease too extensive to warrant us sending them abroad, at least at once, to forage for themselves; cases in which the amount of disease and the lowering of the general health is such that the risks of travel and of living abroad loom too largely to warrant us in sending them away, especially when, as is generally the case, they have to be alone.

(2) Those with slight lung disease, but in whom the constitutional recuperative power is so feeble that a rapid downward course seems probable from the very beginning. Such cases have early involvement of both apices, have much fever, their digestion is feeble, and the liability to laryngeal and other tubercular complications is great.

(3) That class of patients who might, as far as general health is concerned, go abroad and make complete recovery, but who are, as it were, tied up at home, and must remain under any circumstances. They express themselves as able to contemplate a few months off work, but no more; and no matter how you argue with them about ultimate risks, they stand by their decision.

What are we to do in all those cases? We tell them in the first place that tubercular lung disease is a disease which can be arrested or stamped out, if a high standard of general health can be attained and maintained. We tell them that for this abundance of fresh air and sunlight is an absolute necessity. They must go to a locality in the country where they can get this, and they must be in the open air practically all day. We tell them that meals and periods of rest should be taken in the open air, and that for this the use of a tent or awning will often be of advantage in this climate. We tell them that a certain amount of exercise is useful, but it is of the utmost importance to avoid any approach to fatigue or strain. We tell them that their bedroom should be large and airy, and should have an exposure which will freely admit sunlight during the day; also that the windows should be kept open day and night to an amount varying with the season and weather. We tell them to be careful not to strain the voice, to speak very quietly, and to restrain the cough as much as can be done voluntarily; that the expectoration must never be swallowed, and that they should always use for it a pocket spitting flask with antiseptic fittings, such as Martindale's. We also give them some general directions as regards baths, clothing, stimulants and medicine.

But now comes an important subject. For the patient to do all this, a considerable amount of trouble and expense is entailed. A suitable locality has to be fixed upon, a house and rooms have to be selected with all the necessary requirements as regards exposure, ventilation and sanitation; sheltered walking places have to be seen to; couches, awnings, screens and all the impedimenta for lying out in the open have to be obtained. Herein comes the value of that institution of which we are all hearing so much nowadays—the Sanatorium—for the sanatorium offers at once all these, in a way which saves endless trouble, and which is at moderate and definite cost.

But, gentlemen, the sanatorium provides something more. It is said to have been said by the late Lord Beaconsfield that every man is a fool, or his own doctor, at forty. Now, without homologating the statement that every man who is not his own doctor at forty is a fool, there is no doubt that very few men are fit to be their own doctors at any period of their lives. Hence

the sanatorium, with its resident doctor, offers another advantage.

We can tell a patient that he is to be out in the open all day; the sanatorium doctor can see that he is there. We can tell a patient that he is to take exercise, but always short of any fatigue; the sanatorium doctor, knowing the geography of his grounds, knowing the walks, and where the resting seats are, can tell the patient "definitely where, how far, and in what way he is to go," and can see that he goes there. We can tell a patient that he is to eat as well as he can, and what he is to eat; the sanatorium doctor is "able to control the kitchen, and always to superintend the patients during meals, whether in private apartments or in the common room, where he can join them at meal times."

The sanatorium, then, offers nothing different in kind from what the patient can get outside; offers nothing really different from what the patient has been advised to get by sensible doctors for years; it simply offers in convenient combination all facilities for treatment. If, to the British mind, some of the regulations as to eating, drinking, sleeping, lying, walking, playing, and talking seem a little rigid; if it seems a little amusing that for recreation, draughts and dominoes should be gravely prescribed, and whist and billiards by inference proscribed; we must remember that the object is the benefit of the patients, and that, as has been said, "private sanatoria are especially advisable for young people who may be inclined to excesses which are prejudicial to health," *i.e.* for people who do not know where to draw the line. One cannot get everything, and certainly the sanatorium offers many advantages.

Before leaving the subject of sanatoria, there is another matter to which I think it right to refer. It has been said that a great man's disciples are apt to resemble him mostly in his errors. It is no less the case that with a good system there is a tendency to imitate it largely in its weak points. For example, one hears it said that if you only get open air, if you only have open windows, or windows or sashes removed, the patient will be benefited, even suppose that a damp cold air be allowed in, that there is moisture on the ground, and cloud on the sky. Well everything is a matter of comparison, and there are probably some consumptives who would be better

lying on their beds in covered cattle trucks in a railway siding on an Edinburgh November day than in their own small overcrowded and foul-aired rooms. But for the same reason as you would not prescribe a cattle truck in a large town, so you will select a locality which offers a pure dry air and plenty of sunlight. A high altitude with the neighbourhood of pine woods has a reputation, but there are many consumptives just as there are many healthy people who feel most benefited by sea air. Further, one must not forget that a complete change of climatic conditions, and frequent changes of these, are often beneficial.

One sometimes hears it said, also, that for a consumptive, getting wet is of no consequence, and even that he may sit about, or walk about, in his wet clothes. This to me is another example of the tendency to fix upon weak points. It is certainly better to go out and get wet than to stay indoors all day; it is also better to go out and risk getting wet without heavy clothing than go out in heavy clothing and perspire; but common sense dictates that for the phthisical, as for the healthy, wet clothes will certainly do more harm than good.

Moreover, it is to be remembered that treatment in the open air has been found to be most useful for many diseases other than consumption. I have it on the authority of my friend Dr Claude Ker that when about seventy or eighty years ago typhus fever had broken out and was creating havoc in certain districts in this realm, some very cogent evidence of the value of open air was shown. At that time the disease was so rife in certain districts that many of the people got panic-stricken, and in their terror of the disease turned out their fever-stricken relatives and friends into the highways and byeways, and left them there. The result was a splendid illustration of that absolute regard for acts and utter neglect of motives which is characteristically providential, for whilst the large proportion of those selfishly and undutifully turned adrift recovered, the great proportion of those kept in their houses and nursed by affectionate and dutiful relatives succumbed.

Within the last few years, further, I have had some experience of the treatment of such diseases as chlorosis, pernicious anemias, and gastric ulcers in the open air, and I have

no hesitation in saying that the results have been uniformly beneficial.

Lastly, the sanatorium offers so many advantages that it is not invidious to assert that if all the good things which it presents can be secured outside, it would be better for the patient to be outside. I say this, not in detriment to the sanatorium, but because it indicates a further development which I believe will be for good, and that is to use the sanatorium as a sort of educative institution; and when the patient has learnt fully what to do, to send him forth from its precincts, to live among healthy fellow mortals. It is all very well to say that a sanatorium is sanitarily perfect—ask any experienced surgeon whether for his operation cases he prefers a good private house or an hospital with all the modern appliances, and I feel sure he will corroborate what I say.

Now suppose you have got your patient into a good country district, or into a sanatorium where he can get open air, sunlight, resting and exercise, in what way further are you to help him? The food must be nourishing, with proper combination of the albuminous, fatty and starchy constituents. It must be prepared in an appetising form—a good cook is an essential—food must be taken frequently, and in small quantities, rather than the reverse; four or five light meals in the day, with a glass of milk, or rum and milk, thrown in morning or night, or both.

As regards baths, the systematic application of cold is of great use. What I am in the habit of advising is that the patient do the soapy part of his morning ablutions with hot water, as hot as he likes, and then apply immediately, and for a few seconds, cold water, either by the shower or by sponging. The cold water need not, of course, be absolutely cold, but should be sufficiently so to produce a glow of reaction. In this way, the blood-vessels of the skin, at first flushed and dilated, are made briskly to contract; the heat-regulating mechanism is kept in tone, so that, if the patient be exposed any time subsequently to draught or cold, the cutaneous vessels at once contract, and loss of heat, or chill, is prevented. Catching cold, it must be remembered, occurs as the result of sudden exposure to a lower temperature when the skin is warm, flushed with blood, and perhaps perspiring. Before the

small blood-vessels can contract and drive the blood to the internal parts, much heat is lost. If, however, the vessels of the skin are in good tone, they at once contract, and so loss of heat is prevented.

Let us now proceed to the treatment of symptoms in phthisis, and let us begin with the cough. Here the use of the cough in removing secretion and destroyed portions of lung tissue, must first be borne in mind; and we can understand that if the cough is not so severe as to disturb sleep at night, and does not really annoy the patient during the day, no special treatment for it is required. In those milder cases it is apt to occur mainly in the morning, and for its relief a cup of warm tea or of hot milk, or of milk with a teaspoonful of glycerine, or of rum and milk, will often suffice.

If the cough is really troublesome by day or night, an intra-laryngeal injection of menthol in parolein (20 per cent. solution and ʒss or ʒi to be injected) should always be tried. This often relieves most markedly, and it avoids the necessity for cough mixtures, and so interferes less with digestion. If cough mixtures have to be used, the Begbie mixture is, I think, the best, as it acts as a tonic as well as a cough sedative. If a more sedative effect is required, we can use the Brompton mixture; whilst if the throat appears specially irritable, the glycerine and codeia jelly may be tried. In early cases, and especially when the phthisis has resulted from an exposure (catarrhal pneumonic phthisis), a blister over the affected apex is frequently of great use. If the cough causes vomiting, we should advise absolute rest for an hour after food; and if in spite of this vomiting occurs, and the stomach is emptied, efforts should be made to induce the patient to take a fresh supply of food at once.

Next as regards hæmoptysis. If this is slight, complete rest only is necessary, and the patient should be advised to avoid speaking and restrain the cough as much as possible. If necessary, a little morphia may be given to quiet the cough. If the hæmoptysis consists only in the expectoration of a little dark blood in the mornings, and if with this the pulse is rather weak, morphia should be avoided, and a little digitalis may be given at night. In such cases the bleeding is due rather to sluggish circulation, and this the digitalis tends to remove. It

must be remembered here, however, that on the other hand digitalis may do harm by raising the blood pressure, and so causing a hæmoptysis. Our guide for its use is mainly the condition of the pulse. In cases of copious hæmoptysis, our first duty is usually to comfort the alarm of the patient and his friends by reminding him that a hæmorrhage is very seldom fatal of itself. Secondly, we have to remember that slight faintness is salutary in that, through the weakening of the heart's action, the vessels become less filled. We insist on absolute rest; we tell the patient that he must on no account move or speak, and that he must restrain the cough as much as possible. We keep the room cool, and see that the patient's head and shoulders are slightly elevated. An ice bag over the affected portion of lung is often useful; and to prevent the weight of the ice bag disturbing the patient, a good plan is to have it slung. We can extemporise an apparatus for this purpose readily, by tying two sticks to the head and foot of the bed above the patient's body. A piece of cord is tied to the upper ends of those, and from this the ice bag can be slung and allowed gently to rest on the affected part of the chest. A little morphia may be given hypodermically, and it is usual also to advise ergotine, also hypodermically, or some astringent, gallic acid, aromatic sulphuric acid, or Ruspini's styptic, by the mouth. The less given by the mouth, however, the better, and any food should be taken cold.

In all cases of hæmoptysis the condition of the bowels should be carefully looked into, and I must confess that I have seen better results from a purgative in such cases than from any so-called astringent.

Next as regards the fever. In connection with this it is to be remembered that, inasmuch as the fever, with its diminished appetite and digestive power, its thirst, increased waste and emaciation, is the main effect of the disease, the treatment of the fever is the treatment of the whole disease. For it, therefore, we must trust to absolute rest, open air and feeding, and we must use the so-called febrifuge drugs, quinine, phenacetin, antipyrin, etc., as little as possible. In addition to food, wine is often useful, and if the fever is high, the application of cold or the ice bag to the head or the chest, has been recommended.

The sweating, like the fever, is one of the effects of the

disease as a whole, and will also be benefited by general treatment. Occurring, as it is so apt to do, at nights, the patient should not be too heavily clad, and the air of the room should be cool. Night feeding has its uses, and a little milk and alcohol during the night often does good. Sponging the body with a little vinegar and water, and a change of clothing, is required in severe cases; and as regards drugs, probably the Niemeyer's pill, or a pill of oxide of zinc and belladonna, are the most useful remedies. For the laryngeal complication, the patient must be told never to attempt to speak above a whisper. Intratracheal injections of menthol and parolein, the application of lactic acid solution (20 to 80 per cent.) by the brush, or the insufflation of boracic acid and iodoform, or of powdered iodol, have all been recommended. If swallowing is painful, spraying with cocaine solution may be tried before food; and in such cases directions to the patient to suck the food through a tube whilst lying in the prone position has been found of use. In a phthisical patient diarrhœa may result from several causes, *e.g.* intestinal catarrh, waxy disease, and tubercular enteritis. Of these the last is the only one to which we now need refer. This is apt to be rather intractable as regards treatment, and when severe it becomes very exhausting to the patient. For it complete rest is of the greatest importance, and for food we should avoid most of the albuminous and fatty substances and trust mainly to the starchy. Steamed biscuit and milk, corn flour, farola, rice, arrowroot, and sago are often useful. As regards drugs, I generally begin with mercury, and 5 drops of the liq. hydrarg. bichlor., with 5, 10, or 15 of the liq. morphia hydrochlor., are often of service. Failing these, oxide of zinc or bismuth combined with morphia may be tried, and then the various astringents, kino, coto bark, krameria, etc. The number of drugs which in phthisis have been supposed to exercise a favourable effect is unending. I shall only, however, refer to a few. Foremost amongst them comes cod-liver oil. As you all know, many people cannot take it well, but it should always be tried, even in doses so small as a half teaspoonful, and taken before, after, or during a meal. With the cod-liver oil, I am in the habit frequently of prescribing a few drops of the liquor arsenici hydrochlorici. I think they suit well in combination. If the cod-liver oil cannot be taken, we

have recourse to emulsions and maltine preparations. Angier's emulsion, and Parrish's, Easton's, and Fellowes' syrups, have all their uses. Of the tar preparations, I think the old-fashioned tar water is as good as any. Patients may begin with a half or one wineglassful thrice a day, and increase it *ad lib.*

From what has been said, you will see that there is no royal road to the treatment of phthisis. As I have often said, the phthisical, like the poor, we have always with us. We have the consolation, however, of knowing that as the conditions of life improve, as people begin to realise more the sacredness of life and its responsibilities and duties to themselves and to their fellows, as well as the pleasures of living, both of these will become more and more evils of the past.

A SHORT NOTE ON BILHARZIA HÆMATOBIA, AND NOTES OF THREE CASES

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IN an excellent thesis presented for the degree of Doctor of Medicine by Dr George S. Brock to the University of Edinburgh, and later published in the *Pathological and Bacteriological Journal* (1894), the best account of Bilharzia Hæmatobia with which I am acquainted is set forth.

Bilharz in 1851 discovered that an endemic hæmaturia in Egypt was due to a parasite which belonged to the Nematode group of worms. It was named after its discoverer Bilharzia Hæmatobia. In 1864 Dr John Harley found that ova were present in the urine of persons who suffered from an endemic hæmaturia in South Africa and named the parasite Distoma Capense, but Cobbold showed that B. Hæmatobia and D. Capense were the same parasite. The adult worm is known and the sexes are distinguishable. Their habitat in the human subject is chiefly the portal vein and its branches, *e.g.* the splenic ; but it is found in other veins, notably the vesical. That an intermediate host is probable is acknowledged, but as yet none has been discovered, although the general opinion is that it is a mollusc of some kind. The ova are mainly found in the urine, but have been got in different tissues, especially the walls of the bladder and rectum. The embryo is ciliated, but

as I have already said the stages between the ova and adult worm have not been traced. The ova are readily recognised —they are prolate, 0·12 m.m. long, and are furnished with a spine situated either terminally or laterally. It is stated that ova in the urine always have a terminal spine while those which escape per rectum have the spine laterally situated.

Hæmaturia is the salient symptom in those who are infected by the parasite, and the condition is commonly named in South Africa blood-water or blood-gravel: the latter term being applied, as sufferers not infrequently pass small calculi. Indeed a sequel or concomitant of the condition is occasionally a renal or a vesical calculus. Brock states that a very large proportion of the male population, black or white, in certain districts of South Africa are sufferers from this affection, and he believes that probably the parasite exists from Port Elizabeth to Cairo. How the parasite gains access to the human body is not known. Some believe that it gains entrance by individuals drinking impure water, while others think it enters while a person is bathing. The former theory obtains chiefly in Egypt where the disease is common among the poorer classes while it is rare in the well-to-do; and this is explained by the former drinking water from streams or unfiltered water, while the latter are more careful to drink pure or filtered water. Brock admits that drinking impure water is a cause in South Africa, but points out that whereas boys and girls drink water from the same source yet the disease is very rare in girls, while nearly all the boys of a district may be affected. This peculiarity, that males chiefly suffer, is explained by Boer boys all bathing while Boer girls very seldom indulge in that luxury. The advocates of the bathing theory think the parasite gains entrance through the urethra, anus or skin, but it may be suggested that during bathing, water is often involuntarily swallowed.

Whatever the mode of infection the disease at the present time has a special interest for us as so many of our fellow countrymen have been or are in South Africa, in districts where the disease is widespread and the risk of contracting it great, whether from drinking impure water or bathing in the streams where the parasite exists.

In 1899 three cases were under my care, and I propose to

give a short resumé of them. (Curiously enough, while in South Africa this year I only met with one case, although since my return home I have seen a second.) These cases present certain differences of some interest.

First.—Mr H., æt. 21 years, went to South Africa four years ago. After spending a year at the coast he went to Colesberg, and two years later observed blood in his urine, and this has continued ever since—varying in quantity, but almost always present. It caused him no pain or discomfort at first, but latterly, during the early months of 1899, he has had frequency of micturition and priapism. The blood was never large in quantity, but small clots were passed, particularly at the end of the act of micturition. Treatment had been of no avail, and the cause of the hæmaturia had not been discovered. In the specimen of urine which he passed before me there were two minute clots but otherwise the urine was clear. I put a clot under the microscope and detected about a dozen ova in it.

Second.—Mr R. B., æt. 21 years, was a native of South Africa, and came to this country in the belief that he had a stone in the kidney. From the age of 12 he had blood in the urine, but thought nothing of it, as all the other boys at school had red water. When 15 years of age, however, he had renal colic. He never passed gravel, and the bladder symptoms were only aggravated during the actual time of pain in the loin. I examined the bladder cystoscopically, and found it slightly congested over all its extent. I saw nothing abnormal at the ureteral orifices. He had no symptoms of renal calculus at the time he came to me, and I explained the colic by the passage of blood clots through the ureter, and perhaps pyelitis, as there was some pus in the urine. He was under observation for three months, but no acute or further symptoms supervened. The treatment consisted of diluents and salol, 10 grs., thrice daily.

Third.—Mr R. K., æt. 21 years, a native of Natal. This patient had slight hæmaturia, but no other symptom, and asked my advice simply because the blood had been present for so many years, and he feared it might become more serious. He had neither frequency nor pain, and only occasionally passed minute quantities of blood, the clots being very small—pin-head, or less.

In all three cases the ova were readily seen when a blood clot was examined for them. When the urine was clear, even with centrifugalisation, no ova were got — a fact of much significance from the diagnostic point of view. The exhibition of salol in each seemed to do good. Dr Dumas, of Natal, informs me that it is the only drug in ordinary cases which he exhibits in such patients, and he thinks it is beneficial.

Complications may arise in patients who have been the subject of the disease for some years, such as calculi in the kidney or bladder, or pyclitis or cystitis; but in the majority of cases the disease seems to gradually disappear, and it is not the rule for others than adolescents and young adults to suffer. The explanation of this is not easy to give. It is a subject which in the future may be a difficulty in life assurance.

THE BACILLUS COLI COMMUNIS IN RELATION TO CYSTITIS

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Preliminary Consideration.

THE results of the application of exact bacteriological methods have nowhere been more interesting and satisfactory than in relation to the question of the causation and characteristics of inflammation of the bladder. Since the year 1886 when Bumm[1] published a note on the bacteriological examination of eight cases of puerperal cystitis, many important observations have been made, with growing enlightenment as to the difficult problems involved. The question, as one would anticipate, was warmly taken up by the "Guyon" school, and Clado[2] and Halle[3] made important contributions.

The feature of chief interest in the history of this matter is now seen to be what may be called the emergence of the bacillus coli communis, the microbe first recognised, as is well known, in 1886, by Escherich as inhabiting the intestines and possessed of markedly pathogenic properties. Clado[2] isolated a bacillus which he termed the "bacterie septique de la vessie"; Halle and Albarran[4] describe an organism which they named the bacterie pyogene as a chief cause of urinary infection;

and among subsequent observers there is common consent that one form—a bacillus with definite specific character, predominates among all others. Some authors, Doyen[5] for example, name many bacterial forms as concerned in the production of bladder inflammation, and Rövsing,[6] in a work of great importance, claims for various micrococci the chief rôle in the pathogeny. This last observer's contention has given rise to a controversy of much interest on more points than one in connection with the question at issue, but for the moment setting that aside, one may repeat that general consent is given to the fact that one bacillus is predominant among the organisms found in cases of cystitis. Morelle[7] identified the organisms isolated by Clado, Albarran, and Halle with the bacillus lactis aerogenes (Escherich), and Krogius[8] and others identified them with the bacillus coli communis. In this view Melchior[9] agrees, and this observer would further simplify the discussion by showing the identity of the bacillus aerogenes lactis with the bacillus coli communis, an identity also admitted by Escherich.

The frequency with which this bacillus is met with in cystitis is great, much greater than is the case with any other micro-organism. Albarran and Halle isolated the bacterium pyogenes forty-seven times in fifty cases of cystitis, Krogius found the bacillus coli in sixteen of twenty cases, Morelle the bacillus aerogenes in thirteen of seventeen, and Denys the same form in seventeen out of twenty-five cases ; while Melchior isolated the coli bacillus twenty-four times from thirty-five cases, seventeen times as a pure culture.

Of the twenty cases dealt with in this paper fourteen yielded culture of the coli bacillus—not, however, always in pure culture. The consideration of those cases, however, is postponed till a note has been made on the methods of investigation.

Methods.

The difficulty that first presents itself in this bacteriological examination is that of obtaining the urine as it is in the bladder without introducing into it any organism.

It is simple and obviously essential to insure purity of all instruments and vessels used, and to render aseptic parts of

the body surface with which the urine might come into contact, but that of course is not enough.

The urethra of both sexes is the habitat of a number of organisms, some of which are pathogenic and indeed are demonstrably a potential cause of cystitis. This was shown by Lustgarten and Mannaberg,[10] who in 1887 from eight healthy urethras separated ten species of micro-organism; by Petit and Wassermann,[11] who in 1891 isolated fifteen species from four cases; and by Melchior (*op. cit.* p. 261), who isolated eleven species from twelve urethras. In personally investigating this subordinate point I placed a sterile glass tube in the urethra and introducing the platinum needle took cultures from the urethral mucous membrane at varying distances, one two and three inches from the fossa navicularis which was, together with the meatus urinarius, purified so far as possible before introducing the tube. The culture tubes in all instances showed growth and from two urethras examined, five forms were isolated, two micrococci, two bacilli (not bac. coli) and a sarcina.

It is therefore clear that urine can be contaminated either in flowing through the urethra, or by a sterilized catheter passed into the bladder to obtain a specimen.

Various modes of procedure have been adopted, and Melchior, carrying into this department that completeness which has characterised all his work, has proposed the use of a special catheter which alone he claims gives a security that the urine is obtained as it exists in the bladder. He allows, however, that in all cases such elaboration of method is not required, and there can be no doubt that in very many cases it can be dispensed with.

In the cases I have dealt with I employed two simpler methods: either collecting in a sterile test-tube the last of the flow of urine after proper disinfection of the meatus and fossa navicularis, or the use of a sterile catheter lubricated with sterile glycerine. The cultures from urine so collected did not seem to show contamination, but I was careful in every case to make the culture *immediately* after getting the specimen. This is certainly essential, and examination of specimens collected after these simpler methods and kept even a short time cannot be expected to give *reliable* results. The specimen being

thus taken immediately to the laboratory, was dealt with as follows. With a platinum loopful of the urine three agar tubes (or better, gelatine roll tubes) were inoculated and placed in a suitable incubator; then the specimen was centrifugalised and, if it seemed advisable, further cultures made from the deposit, and finally films were obtained from the deposit and stained. Secondary cultures in various media were made from the agar growth, and then examined as to morphology and pathogenicity as will be detailed later.

While this simple mode of obtaining the urine is clearly not theoretically perfect, yet it may be noted that healthy urine so collected did remain sterile, and that in a case of tubercular cystitis the culture tubes showed no growth.

Cases Examined.

Twenty cases of cystitis were investigated as to their bacteriological relations, but I am not in a position to give in detail the clinical histories of the patients, and would merely make a general statement regarding them.

My intention was to study cases of cystitis in males with acid urine, and of the twenty patients seventeen were therefore males, and twelve were cases of "acid cystitis." The cases of three female patients are included, because the necessity for these examinations arose in the period during which the work was being carried on, and for a like reason some cases were also investigated in which the urine was alkaline and ammoniacal.

The seventeen male patients fall into three groups, excluding two solitary cases.

The *first group* is one of four cases when the urine was alkaline and ammoniacal, and was found to contain in three instances a pure culture of staphylococcus (caurureus 2, albus 1), and one a mixed culture of staphylococcus, streptococcus, and colon bacillus. Two of the cases were cystitis secondary to calculus, and two cystitis due to catheterisation.

The *second group* was that of three cases of prostatic enlargement without decided evidence of cystitis, *i.e.* with symptoms referable rather to the state of the prostate than such as necessarily follow inflammation of the bladder. All three cases yielded pure cultures of the bacillus coli communis

in a typical form, and with all usual cultural relations save that in one the positive Indol reaction was absent.

In these cases, however, the distinguishing character was the abundance of bacterial growth and the sparse occurrence of leucocytes. They might fairly enough be termed cases of bacteriuria, and one touches here a question of interest, and probably one cause of recent controversy as to the true rôle in this relation of the bacillus coli, viz., whether the term cystitis is to be used in a given case on clinical or on microscopic evidence, because of the presence of certain recognised symptoms, or the presence of a given number of white cells in microscopic films.

Guyon's postulate that without pus there is no cystitis is to be accepted notwithstanding Rövsing's claim for "catarrhal cystitis," but it is not so evident that cases with few pus cells (or leucocytes) should be classed with cystitis, where clinically they would seem out of place. The classification of cystitis cases is a large and difficult subject and should not here occupy us; the fact, however, that so commonly in the "brothy" urine of prostatic cases, in circumstances favourable to its growth, the coli bacillus is abundantly present without *clinical* evidence of cystitis, is worthy of consideration in relation to the asserted importance of the organism as a cause of cystitis. N. Halle admits cases to exist intermediate between bacteriuria and cystitis, some leucocytes being found in the sediment, but mainly organisms; it seems doubtful whether a bacteriuria with *no* leucocytes is possible, and this differentiation appears artificial and purposeless—the two conditions, bacteriuria and cystitis, being clinically definite and distinct.

The *third group* of cases includes eight well-defined cases of cystitis with acid urine, and without disease of the prostate or any history of infection from instruments.

Five of these cases gave the coli bacillus in pure culture with typical characters, and in the other three a bacillus was isolated, not in all respects conforming to the type, but so closely approaching it as to lead one to class it as "coli" too — perhaps a variety. The polymorphism of the bacillus coli communis, indeed, has proved, as has been seen, a source of trouble and confusion, and the forms isolated in these cases with which we are now concerned are placed in the group,

not as in all respects conformable to one type, but as marked by no feature so distinguishing as to justify separation from it. In one instance the organism isolated appeared to grow in culture like the bacillus lactis aerogenes rather than the coli bacillus; but consideration of this organism led one rather to Melchior's position that division between coli and aerogenes as distinct species is not justified.

The *sixteenth case* was one of tubercular cystitis; the culture media showed no growth (the urine being collected by direct flow into a sterile tube) and after centrifugalisation tubercle bacilli were found in films from the slight deposit present.

The *seventeenth* was a case of cystitis following gonorrhœa and retention. The condition was not severe, but well marked clinically, the urine cloudy and of acid reaction to litmus paper; the films from the urine showed the gonococcus and a bacillus which retained Gram's stain. Five days later the same two organisms were again found present, but after ten days of treatment the urine became sterile.

The bacillus was motile, short, often lying in pairs, but never seen in chains. On agar it gave a pale lemon-yellow growth, and a gelatine "stab" culture showed a yellow surface "button" and a fine pencil of growth with distinct lateral out-budding at intervals. A shake-culture of lactose gelatine coloured with blue litmus showed neither change of colour nor formation of gas.

Injection of a guinea-pig subcutaneously with 2 c.c. broth culture (48 hours old) gave no results.

Of the *three cases of female patients*, one was a tubercular cystitis, the urine containing tubercle bacilli and staphylococcus, the second was a case which yielded a pure culture of the colon bacillus, and the third exhibited a mixed infection, bacillus coli, staphylococci, and streptococci being found and cultivated.

This last case is worthy of remark, in that after fourteen days' treatment by irrigation with silver nitrate (1·500) cultures from the urine showed bacillus coli alone, and that very sparsely, and further that this "coli" injected in broth culture into a guinea-pig induced local suppuration, which in my cases only happened in two instances.

A survey of the twenty cases thus shows (as in the subjoined table) that the bacillus coli communis was found present fourteen times and twelve times in pure culture—and in these twelve instances the urine was acid, and speaking generally, the symptoms not of a severe type. This is, as was to be expected, a corroboration of observations already alluded to as proving that this is the micro-organism most commonly met with in the urine in cystitis, but that it is the cause of the disease, however probable the inference, cannot be without question assumed.

Group.	Bac. Coli Comm.		Staphylococcus.		Streptococcus.		B. Tuberc.	Bacillus.
	Pure.	Mixed.	Pure.	Mixed.	Pure.	Mixed.		
I. 4 cases	...	1	3	1	...	1	...	...
II. 3 cases	3	...	...	...	...	...	...	...
III. 8 cases	8	...	...	...	...	...	...	...
IV. 16th case	...	...	...	...	...	...	1	...
V. 17th case	...	...	...	...	...	...	...	1
VI. 3 cases (in women)	1	1	...	2	...	1	1	...
Total	14		6		2		2	1
	12	2	3	3	...	2		

Relationship of Bacillus Coli Communis to Cystitis.

Proof that the bacillus coli is able to cause and does cause cystitis is, however, not wanting.

Melchior[1] has strenuously maintained that in this organism we have the most important and predominant cause of the disease, combating the view of Rövsing that the frequent presence of the organism in the bladder in cystitis is not so to be interpreted. And for his conviction, Melchior shows very sufficient ground; it may, in fact, since the results of his work have been known, be held as beyond doubt that the organism can and does cause cystitis.

[1] *Op. Cit.*

There are, however, certain points still requiring elucidation before the view is adopted that this bacillus is the chief and most frequent cause of inflammation of the bladder.

There is, to begin with, the fact that patients with enlarged prostate, who have had retention of urine and unhealthy bladder conditions associated, may have for prolonged periods in their urine abundant growth of the bacillus, without symptoms of cystitis and few leucocytes in the urinary deposit.

Then Melchior (*op. cit.* p. 118) has himself noted that cure of the cystitis does not necessitate complete freeing of the urine from the bacillus, which, on the contrary, he found present long after "apparent cure" had been effected.

A further fact to be kept before the mind is the ubiquitous character of the bacillus, the frequency with which one meets it in conditions originated by other forms of micro-organisms (*e.g.* peritoneal inflammations) and particularly the fact that it is found in all sorts of cystitis—acid and fœtid—at all stages and in cases differing widely in causation, clinical features and in progress.

One has therefore to exercise caution, not assuming that the bacillus found so often in inflammation of the bladder is necessarily the cause of that inflammation, but holding it possible that in many instances it may have supplanted a micro-organism earlier in the field and the true cause of the disease. This aspect of the problem forms the subject of an interesting paper by Maxwell and Bruce Clarke (*British Medical Journal*, Nov. 25th, 1899).

It has been shown by many observers that micro-organisms introduced into the healthy bladder do not induce cystitis, but after a short time disappear from the urine. The period of time necessary for the re-establishment of sterility in the urine would seem to be from one to three days. Guyon in 1885 inoculated the urine in the bladder with staphylococcus aureus, streptococcus pyogenes, and "bacillus pyogenes" (bacillus coli), and after the second day found the urine in all cases again sterile.

Rövsing found after a few hours the urine was freed from organisms introduced, and in Melchior's experiment the period that elapsed was one to three days.

Experimental Investigation.

My own experience has been that if 2 c.c. of "coli" broth incubated for forty-eight hours be thrown into the bladder of the male rabbit [1] no evidence of cystitis followed at all, but the bacillus was found present in the urine till the fourth day after. The day after inoculation the urine was clear, and films showed a few round cells and the bacteria lying in clumps; from this urine a typical "coli" growth or agar was obtained. On the fourth day a second specimen of urine was examined after being centrifugalised; there was no deposit, but the microscope showed a few leucocytes and degenerating "beaded" bacilli. On the sixth and sixteenth days the urine was found sterile. This experiment was done on three occasions with like results.

In other three rabbits a mixed culture was thrown into the bladder, viz., bacillus coli and staphylococcus aureus, 2 c.c. of a forty-eight hours' broth culture of each; the following day a clear urine was drawn off for examination which showed crystals of phosphates, mucous and white cells, motile rods in clumps and staphylococci; a culture on agar showed both organisms present. A second specimen got on the second day showed pus and both organisms. On the seventh day in one instance the animal seemed unhealthy, and there was reddening of the penis, marked urinary irritation and dribbling, the urine was cloudy, not ammoniacal, and gave a culture of bacillus coli *only*; on the tenth day the urinary irritation was subsiding, the animal seemed well, and again the bacillus coli alone was isolated as culture; upon the fifteenth day the bacillus was still present, but a few days later disappeared from the urine. In the other two observations the urine became sterile after the fifth day and no evidence of cystitis, beyond the increased number of leucocytes in the urine, presented itself.

It is probable that in the case where cystitis supervened, some slight injury to the bladder had resulted during the

[1] The penis and surrounding parts of the rabbit were carefully washed with sublimate solution, and then with absolute alcohol; the broth was injected from a sterile glass syringe through a silver catheter which had been boiled. The specimens for examination were drawn off by the same catheter into the tubes of the centrifuge previously sterilized.

manipulation, and the general result (as previously known) is that the micro-organism is not in a position to cause cystitis (except in the instance of the Proteus Hauser), unless there is the primary action of retention of urine, or of any other mechanical, chemical, or thermal injury to the vesical mucous membranes.

In suitable circumstances organisms present in the bladder will cause cystitis, but there are great variations in their activity in this respect.

Rövsing describes a "catarrhal cystitis" due to non-pyogenic organisms, and when pyogenic forms are present believes that the decomposition of urea is the primary factor which favours their growth and action.

Melchior has, however, shown, and indeed it is abundantly manifest, that cystitis can exist without ammoniacal urine, and the case of one of the female patients described in this paper shows that a urine in cystitis may contain bacillus coli, streptococcus and staphylococcus aureus and yet not be ammoniacal.

The organisms vary greatly in pathogenicity from influences still very imperfectly understood, and this no doubt will hold true of their activity in cystitis. In the case of the bacillus coli this variation is very decided, and may account in some measure for the widely differing clinical features with which its presence in the bladder is associated, but it is interesting to see that when present with the staphylococcus aureus in the bladder of the rabbit it persisted after the extinction of the other form, and to note with that extinction the cessation of symptoms of bladder irritation. One may also remark that the presence of coli bacillus and staphylococcus in the urine seemed to occasion greater irritation than the bacillus coli alone. There was a most decided increase of leucocytes in the films taken from the urinary deposit in cases where the inoculation of both organisms had been made.

It is not suggested that a supplanting activity is alone characteristic of the bacillus in all cases; Melchior's work has proved its existence in very early stages of the disease and its power to cause cystitis as already stated; but its very frequent presence in the urine in cystitis, and its presence often without marked clinical evidence of cystitis, may perhaps thus be in part accounted for.

Characteristics of Bacilli from the Bladder in Cystitis.

Something may now be said as to the morphological characters and modes of growth in cultures of the bacillus isolated in these cases which have been identified with the bacillus coli communis.

This organism, as has been remarked, exhibits a marked polymorphism, and thus has arisen in the past much confusion and discussion with reference to its relations and properties.

In determining the identity of the bacillus cultivated from the urine in these cases, one was wishful if possible to connect them with an already recognised form, even although in morphological features and cultural relations they did not in every respect conform to the type of that form, and comparison was made with cultures of the coli bacillus obtained from various sources (healthy bowel, diarrhœa cases, abscess of liver), and also with a culture of the bacillus lactis aerogenes It was in the result found that in eight cases the bacillus conformed closely to the typical coli, though even then not in all respects. In five cases there was divergence from the type, but not such as seemed to justify separation from the group; and in one case the bacillus seemed to be the bacillus aerogenes, and therefore according to Escherich and Melchior also rightly (as it appears to me) brought into the "coli" group.

The media and modes of culture were those usually employed, serum but rarely, agar, gelatine, potato, milk, broth and sterile acid urine in every case.

Upon *agar* one commonly got the growth sufficiently known and described in the books, as typical of the bacillus, but on this medium it was that an important divergence manifested itself. The colonies in three instances instead of spreading with thin foliate margin became heaped up in waxy drops, more viscid than in the usual growth; this variation was first noted by Laruelle in the bacteriological investigation of cases of peritonitis, also in 1886 by Escherich, and by Krogius and Melchior. The viscidity of the growth was greater on glucose agar, when it was very marked, long threads adhering to the needle on its withdrawal.

The same variety exhibited a like property on *gelatine*; when in roll tubes one had the deep granular yellowish-brown

circular colonies, and on the surface colonies like drops of white wax instead of the spreading colony with irregular margin.

Throughout the period of observation the varieties held to their distinctive type in whatever way they were transplanted, but Melchior on one occasion got the opaque variety to pass into the common form.

The opaque viscosity of growth was a feature of his cases which led Morelle to join the organism he isolated to the aerogenes rather than the coli group, but the character is common to both and lends strength to the idea of their real identity.

A very pretty reaction of the coli is that introduced by Wurtz[12]: gelatine with 2 per cent. lactose is coloured amethyst with litmus; cultivation of the bacillus causes a varying amount of gas production and reddening, ultimately decolorisation of the gelatine. The time occupied in this change of colour varies very greatly, as also its degree of completeness, and one found that after a period of six or eight weeks the amethyst colour returns, first near the surface, where it was earliest lost.

The *Indol Reaction* I found an unreliable guide, being absent in the case of organisms which one could not doubt belonged to the "coli" group; but this and the culture in *milk* are of interest mainly with reference to another aspect of the coli bacillus, its relation to Eberth's organism. The power of coagulating milk possessed by the coli bacillus is of use in distinguishing it from the bacillus of Eberth, but the point of interest to note now is the very wide variation as to the time required to bring about the coagulation; one usually has a firm clotting after forty-eight hours' incubation, but in some instances periods of many days (ten to fourteen) elapsed before the change occurred, and yet the presence of the organism was proved by returning it to agar.

Of special interest here is the cultivation of the bacillus coli in *sterile acid urine*; urine *in vitro* containing this bacillus retains indefinitely its normal reaction to lithmus. This has of course been known, and here one has simply to confirm previous observations. Dr J. C. Dunlop very kindly investigated the point for me and found that after twenty-one days

culture urea was *slightly* reduced, extractive nitrogen and preformed ammonia being increased.

While remaining acid the urine acquires a characteristic pungent odour readily recognised, sometimes, as it is said, fæcal, and shows a thick viscous deposit.

The microscopic examination of films prepared from various cultures fully confirmed accepted statements of the marked polymorphism of the bacillus coli communis.

From an agar growth twenty-four hours old one gets a tolerably uniform appearance of short rods with rounded ends (1·2 × ·5 mm.); on examining an older culture (say fourteenth day) the rods are longer and more slender.

In the young culture the organisms are so short often as to appear like cocci to a careless glance, and a diplococcus appearance from terminal staining of the rod is frequent; very commonly the rods lie in pairs, end to end.

Growths on gelatine show a larger and thicker form, and often in older cultures (ninth to fourteenth day) long rods and filaments, chains of short rods and masses of short forms of "coccus" appearance; on returning this growth to agar the form noted above is again got.

These forms found in old gelatine cultures are often not unlike the Proteus Hauses, but in the case of that organism the gelatine is of course liquified.

These longer and filamentous forms appeared both in ordinary and in acid gelatine; Melchior and Halle have observed that the short form appears usually in acid and the longer in alkaline culture media.

In broth cultures a tendency is found to very long slender and ribbon-shaped filaments, and in acid urines too, long forms abound. In films obtained from the deposits in the cystitis cases the average rod was longer and thicker than that got in a young agar growth; they frequently lay in pairs and chains, and filaments were occasionally met with.

In one instance the film showed precisely these forms found in an old gelatine growth, rods, filaments, chains and massed very short rods, cultures on agar and gelatine yielding the forms already noted.

Motility was an essential characteristic in all cases, but the degree in which this faculty was possessed varied greatly: the

filamentous forms moved but slightly with a slow waving, and the shorter rods were more motile under certain conditions; the early broth culture showed highly active forms, in urine cultures movement was much less decided. In this relation I may mention that a typical agar culture of Eberth's bacillus on being planted in sterile acid urine developed into longer and filamentous forms and on the fourth day almost wholly lost motility, but on a return being made to agar the typical form and motility were recovered.

All the organisms here regarded as of the coli group took the aniline stains well—Thionin blue was the reagent usually employed; when stained after Gram's method, complete decolorisation occurred.

Considerable variation was exhibited in staining, however; usually the short form in young culture stained deeply and well, but at times clear spots remained in the centre, giving the appearance of a diplococcus.

The older culture of course did not stain so well, particularly those on gelatine—and the filaments in broth and urine cultures also gave a partial and "beaded" staining.

The Pathogenicity of the Coli Bacillus from these cases of Cystitis.

This was tested by injecting under the skin of guinea-pigs of 2c.c. of a broth culture after forty-eight hours' incubation.

This was done in two cases, the animals being weighed before the inoculation and at intervals thereafter, and the temperature in the rectum noted before and after.

The first point to be noted is that in only two cases did local suppuration follow the injection. Further, the proceeding was followed by tolerably uniform results; emaciation occurring with fever for a few days and then lowering of the temperature. Four animals recovered, six died at varying intervals (ten to twenty-one days after inoculation).

In all to some extent, and in two instances very markedly was found swelling of Peyer's patches, and injection of the intestinal vessels. Microscopically the solitary glands showed dense leucocyte infiltration but no organisms, and cultures from blood of the heart, kidneys, and bladder of animals after death

gave negative results except once when a staphylococcus was isolated, resulting, no doubt, from contamination.

Comparison of these results with that got with a "coli" culture from a case of diarrhœa showed complete agreement; and these results are such as were noted by Escherich and others. Melchior found the organism in his cases induced subcutaneous suppuration more usually, but proved its virulence to vary greatly.

That the pathogenicity of the organism as separated from the intestine does vary greatly, according to the surrounding conditions, is an established fact.

Summary.

1. The bacillus coli communis is met with in the great bulk of cases of cystitis, and in many is apparently the determining cause of the disease.

2. In certain cases the organism is abundantly present during long periods in the bladder, under favouring conditions, but without causing cystitis.

3. Certain of the facts lend support to the view that often the bacillus is a supplanter of other forms rather than the initiating cause of the disease.

4. The marked polymorphism and varying pathogenicity of the organism would account for the conflicting opinions held regarding its identity and its rôle in cystitis, and the confusion of nomenclature until recently prevailing.

5. No one culture reaction enables the organism to be with certainty recognised, but cultivation on several media is needful.

The work upon which this paper is based was done during the year 1898 and spring 1899, in the Royal College of Physicians Laboratory, Edinburgh.

The facilities given me for my work call for my warmest thanks, and I may be allowed particularly to express my recognition of the encouragement and valuable help afforded me by Dr Nöel Paton during the whole period.

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A CURIOUS CASE OF DISORDERED CEREBRAL CIRCULATION

By PHILIP G. BORROWMAN, M.B.,
Crieff

THE interest in the following case lies not so much in the course of the illness, as in what I believe to have been its cause. The case occurred some years ago.

The history obtained from the boy's grandmother with whom he lived was as follows :—

P. B., aged 9, had always been a strong healthy boy, and he was getting on well at school. He had no illnesses till eighteen months before the onset of the present one, when he had both measles and whooping-cough in the same summer. He apparently recovered completely from both. For some weeks before this illness came on, the boys on the village green were in the habit of amusing themselves by trying which of them would stand longest on his head while another boy held him up by the legs. This, it seems, was a daily practice. My patient used to remain longer in this position than the other boys.

On 6th October, after standing on his head in this way for an unusually long period (half an hour, as I was told by two women who witnessed the performance), he complained of headache and went to bed. Next morning he still had a headache and did not get up, and he vomited "some green stuff like the bile on the stomach." He took very little food, and

was very drowsy. His face was rosy but not flushed. During the following six weeks he slept almost constantly night and day. If he sat up for a little he felt quite tired, and wanted to lie down again at once.

On 13th November he had a slight attack of epistaxis.

I saw him for the first time on 15th November, six weeks after the commencement of the illness (up till now he was not under any medical treatment) and I found his condition to be as follows :—

Temperature 99° F. He lay very still in bed, on his left side, with his thighs flexed on the abdomen and his legs flexed on the thighs. There was no retraction of the head. His face was rather stolid, and neither flushed nor pale. There was no knitting of the brows. The pupils were dilated and reacted slightly to light. His arms and legs were a good deal wasted, but the trunk was well enough nourished.

Alimentary System.—His lips, teeth, gums and tongue were normal. His appetite was very small, and he was not particularly thirsty. His bowels were regular. The abdomen was slightly retracted, but not markedly so, and was slightly tympanitic all over.

Circulatory System. — The pulse was 92, regular, soft, very compressible and small in volume. The heart's action was feeble with a slapping second sound. There were no murmurs.

Respiratory System.—The respirations were regular, 26 per minute, and normal in character. I made out nothing unusual by percussion or auscultation.

Urinary System.—He micturated only once, or at most, twice in twenty-four hours. The urine was straw-coloured and acid, the specific gravity was 1010, and there was no albumen nor sugar.

Integumentary System.—At first he used to sweat a good deal, but latterly this had ceased.

Nervous System.—The pupils were dilated and sensitive, but sluggish. Sight and hearing were normal. The organic and skin reflexes were normal and the patellar reflex was somewhat exaggerated. His intelligence was by no means bright, but not much worse than that of most boys of his age and class. He lay quite quiet without speaking, except when spoken to, and he greatly disliked noise. He slept all night, turning two

or three times, and during the day he slept for, say, fifteen minutes and woke for thirty or so.

Locomotory System.—There was nothing particular to notice in his bones and joints, but the muscles of his arms and legs had wasted to about half their former size. The wasting seemed to affect all the muscles equally. The trunk was not wasted.

The only treatment I adopted was to order him ℥x of tincture of digitalis three times a day, to strengthen the heart's action.

On 17th November (the second day after beginning to take the digitalis) he began to talk and to take notice of what was going on. Two days later he was out of bed, and within a week he was able to be up for six hours daily, and joined freely in conversation, but did not care about play. He sat in an easy-chair by the fire.

On 28th November, however, I found him standing by a table playing with toys, and, judging by the erection he had made, he must have been at it for a considerable time, yet he was not tired. By the middle of December he was playing with the other boys on the street as usual. Shortly after this he went to work as a butcher's message boy, and has remained well ever since.

The question naturally occurs to one, Was there any connection between this boy's standing on his head and his subsequent condition? I believe that not only were they connected, but that the inverted position of the body was the direct cause of the illness.

The only other condition which would be at all likely, so far as I know, to produce symptoms at all like those which occurred in this case is tubercular meningitis. We may, I think, at once dismiss the simple meningitis of children, posterior basic meningitis, and otitis media as possible causes, as the symptoms I have described do not seem to me to be consistent with these affections.

Tubercular meningitis, as one generally observes it, and as it is described in text-books (1), begins insidiously: there is a change in the child's disposition, he is fretful and irritable, or he sits quietly or lies about instead of playing, and complains of feeling tired. He generally sleeps badly and is restless in bed. Constipation is a marked symptom and generally persists throughout the illness. As the disease progresses, cerebral

vomiting commonly occurs, and headache and knitting of the brows are seldom absent. The temperature is raised, often very high, with delirium and frequently convulsions. Intolerance of light and sound are very marked and the child resents being disturbed. Disorders of speech occur in some cases. The pupils are commonly dilated, but sometimes contracted, and often unequal. Strabismus, and sometimes nystagmus, and alterations in the respiration, particularly Cheyne-Stokes breathing, are apt to occur, especially in the final stage of the disease.

None of these symptoms taken singly can be considered pathognomonic, but taken together they make a tolerably distinct clinical picture.

Now, in the case I have just described, very few of these symptoms were present and the whole clinical picture was different. There was no insidious commencement. The boy was in perfect health till 6th October, when, after the performance on the village green, he complained of headache and went to bed. There was no irritability nor restlessness. He simply slept almost continuously. He was not constipated and he only vomited once, on the second day of the illness. He had headache at first but this soon passed off, and there was no knitting of the brows. There was no marked fever nor delirium nor convulsions. I did not see him in the early stages, but I should undoubtedly have been sent for had any of these occurred. His pupils were dilated and sluggish, but this and the intolerance of noise and the somnolence were the only symptoms consonant with tubercular meningitis, and such a rapid and complete recovery as this boy made is not what one would have expected.

On the other hand, I think all the symptoms can be accounted for on the theory of passive congestion. There can be no doubt whatever that the boy remained in the inverted position for a very considerable time, though probably not quite so long as I was told (half an hour). This practice of standing on his head had also been indulged in, for shorter periods, almost daily for some weeks.

Dr Leonard Hill, in his interesting article on Experimental Pathology of the Cerebral Circulation (2), says: "If the torcular Herophili be opened in the freshly killed animal, and the abdominal and thoracic veins compressed, venous blood

can be driven out of the torcular in a continuous stream. Likewise in the human subject, fluid can be driven from the femoral vein out of the cerebral sinuses"; and again (3), "the blood pressure within the cranium is in closer relation to the vena cava than to the aortic pressure." It is therefore manifest that the prolonged inversion of this boy's body would throw the weight of a column of blood, equal practically to the boy's height, on the cerebral veins, causing great engorgement. This of course caused compression of the brain substance and of the capillaries, with the natural result that the arterial circulation was impeded and a condition of practical anæmia of the brain resulted. As Dr L. Hill says (4), "persistent mechanical congestion of the brain causes somnolence, mental inactivity, vertigo and other symptoms which are characteristic of cerebral anæmia. Anæmia of the brain produces the same effect whether the flow of arterial blood be reduced by a fall of arterial pressure or by a rise of venous pressure. In both cases the brain is congested with venous at the expense of arterial blood."

As I did not see the boy till some six weeks after the onset of the illness, it is difficult to be sure of his actual condition in the early stages, but I am inclined to think that the venous engorgement and consequent arterial embarrassment of the cerebral circulation are more likely than tubercular meningitis to have been the cause of the symptoms.

After the prolonged rest in bed, the cardiac action, strengthened by the digitalis I gave him, was sufficient to raise the arterial tension and so restore the balance of the cerebral circulation. This seems to me the explanation of his rapid and complete recovery.

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A CASE OF PSEUDO-HYPERTROPHIC MUSCULAR PARALYSIS

Read before the Aberdeen Medico-Chirurgical Society

By GEORGE ROSE, C.M., M.B.,
Surgeon Royal Aberdeen Hospital for Sick Children

MR PRESIDENT AND GENTLEMEN.—The patient that I have the honour of bringing under the notice of the Society to-night suffers from pseudo-hypertrophic muscular paralysis, one of a small class of diseases that have been grouped together under the common name of progressive muscular dystrophy. The group is characterised by great and progressive muscular weakness and wasting; this wasting being a true disease of muscle tissue, differing thereby from other forms of muscular atrophy, *e.g.* progressive muscular atrophy, and infantile paralysis, which result from disease of the spinal cord. True diseases of the muscles are few in number and the one under consideration to-night, pseudo-hypertrophic paralysis, is the most frequently met with in this country.

Among the differences that distinguish this disease from others of the same group, the most prominent one is the increase in size and firmness of certain muscles, the muscles affected being in each case fairly constant.

The muscles commonly enlarged are those of the calf, the glutei, the infraspinatus, and the deltoid. There is generally atrophy of certain muscles, those commonly affected being the latissimus dorsi and the sternal portion of the pectoralis major. The manner in which some of the other muscles of the body and limbs are affected is less constant, muscles in one case being atrophied and in another hypertrophied; but whether atrophied or hypertrophied, the power of the muscles is progressively diminished till the patient becomes helpless and unable to lift himself from the bed. The nature of the change that takes place in the muscle will be referred to later.

Gowers regards the disease as due to a defective tendency of development of the muscle tissue—hence it is congenital—a potential malady at birth which becomes an actual disease in early life. Whether this be true or not, certainly although congenital examples of the disease have been found, generally it is not till some time between four to ten years that it makes

PLATE II.—DR ROSE'S CASE OF PSEUDO-HYPERTROPHIC PARALYSIS.

Illustrating the patient's manner of rising from the recumbent to the kneeling position.

its appearance. Boys are far more frequently attacked than girls, and often several of the same family are affected.

From the nature of the disease, the initial symptoms are tiredness, early fatigue, a tendency to fall, with difficulty in rising, and inability to climb a stair. The muscles begin to alter; the gait changes and becomes waddling, and later, on account of contraction of the calf muscles, there is talipes equinus. Through muscular weakness the normal curvature of the spine becomes changed, there being kyphosis on sitting, and lordosis on standing. On rising from the supine to the erect posture the movements gone through are almost pathognomonic of the disease. The reflexes and the electrical reaction alter as the muscle tissue becomes weaker: sensation generally remains unaltered to the last. The patient generally dies before puberty from some lung complication. Treatment is useless to check the course of the disease.

Such is a brief outline of the complaint. I shall now show the patient: but before doing so I shall read an abstract of careful notes made by Mr Cassie, acting house-surgeon, and confirmed by me.

G. S., a boy aged 9½ years, came under my care in the Children's Hospital on 11th August of this year. His state on admission briefly was as follows—pulse 104; respiration 24; temperature averaged 99; weight 3 stone 5½ lbs; height 4 feet 1 inch. He looked a dull boy but answered questions readily though slowly. He had not much idea of time and mental exertion soon tired him. He lay on his back listlessly and his muscular development as a whole was slight.

Family history.—Father and mother and brothers and sisters (8) all alive—healthy and with no sign of nervous disease.

Paternal	grandfather,	died at	44 of pneumonia.
	grandmother,	alive,	70.
	1 uncle and 5 aunts	alive and well.	
Maternal	grandfather,	died at	57 of apoplexy.
	grandmother,	„	55 of bronchitis.
	1 aunt,	„	49 of cancer of mamma.
	1 „	„	28 of hip joint disease.
	1 uncle,	„	? of pneumonia.

Of others there was no definite history.

Previous history.—Up to two years ago, till the boy was 7½ years, he was the same as other boys of that age, but then his parents noticed that he was what they considered as "getting lazy." Soon he had difficulty in rising, and became more helpless.

Present condition.—When taken out of bed and stripped for examination he stood with his feet from 12 to 18 inches apart with the toes turned inwards, but with the soles of the feet planted flat on the ground. He could not stand long without tottering and needed to get support. There was marked lordosis of spine, which was intensified in amount by the size of the gluteal muscles. He could stand on his tip-toes when asked.

When he walked he began slowly with his feet widely apart. As he put his right foot forward he quickly bent his body to the left side, then bent it as quickly to the right when his foot was firmly planted on the ground. The same process was gone through with the left, thereby giving his gait a waddling character. When he walked he held his legs stiff, and his toes were turned inwards, but he did not walk on his toes nor had he difficulty in turning round.

He could clench his jaws tightly and close his mouth and eyes firmly. He could also whistle. His grasp was weak but equal on both sides. Pushing movements were weak, pulling movements were stronger. He could not ascend a stair without grasping the bannisters or clinging to the wall. If ascending by the bannisters, he slowly pulled himself up; if by the wall, he pushed himself against it to get at purchase, slowly raised first one foot, then the other. He could not descend without support. He could not rise from the bed from the supine to the erect position without an elaborate series of movements which were characteristic of the disease, and of which we succeeded in getting a number of photographs.

His method of lying down was practically the reverse of his rising, although occasionally he varied his method by bending so far, and then suddenly twisting his body, he would drop down on his buttocks.

Muscular system.—The calves measured 10½ inches in circumference, and the upper part of the thigh only 12 inches; round the buttock, 24 inches.

PLATE III.—DR ROSE'S CASE OF PSEUDO-HYPERTROPHIC PARALYSIS.

From the kneeling to the feet and hand position.

The following muscles were enlarged and firmer than normal: (1) the muscles of the calf; (2) glutei; (3) supra- and infra- spinatus; (4) anterior tibials; (5) upper part of left sartorius; (6) supinator longus; (7) deltoids slightly, specially the anterior bundle of right.

The following were wasted: (1) latissimus dorsi; (2) serratus magnus; (3) sternal portion of pectoralis major; (4) quadriceps of leg; (5) biceps of arm.

The erector spinæ and the hamstring group were doubtful. The muscles of the face, hands and feet appeared unchanged.

Reactions to the faradic current.—Speaking generally, the skin seemed hyper-sensitive while the excitability of the muscles was much reduced. In the legs, the anterior tibial group of muscles reacted only to very strong currents; the extensors of the knees, the adductors of the thighs, and the calf muscles reacted more actively but much below normal. In the arms, the flexors and extensors of wrist and fingers, the supinator longus, the biceps, deltoid and clavicular part of the pectoralis major reacted to moderate currents but distinctly less actively than normal: the triceps, supra-spinatus, infra-spinatus and sternal part of the pectoralis major required much stronger currents; no reaction was seen in the latissimus dorsi.

Nervous system—Reflexes.—Plantar, slight, only flexion of toes; patellar, absent; cremasteric, present but diminished; epigastric and intrascapular, active; no ankle clonus.

Hearing was defective; sight normal; sensation to touch and temperature normal, to pain hyperæsthetic.

The salient features of the case therefore were: (1) great muscular weakness; (2) enlargement of certain muscles and wasting of others; (3) loss of knee jerk and diminution of other reflexes; (4) hyperæsthesia to pain.

The patient was allowed to run about with the other children of the ward, but although he improved at first, certain changes were manifestly slowly occurring. On 18th November a general examination of his condition was made, and those changes were noticed:—

In standing the heel was not pressed firmly on the ground and walking was more difficult, there being evidently talipes equinus.

The calf muscles were more flabby and measured less by

¾ in., and there was a decrease of ½ in. round the buttock. The biceps and triceps were more wasted and the deltoids were hypertrophied.

The appearance of the face had altered. The lips were wider apart and the upper lip thicker and his nose broader and flatter. He could close his eyes and mouth firmly, could whistle and could stand on his toes as formerly, but the general muscular weakness had increased.

The accompanying plates illustrate the method of rising from the recumbent to the standing posture.

Microscopic appearances of pieces of the Biceps and Gastrocnemius.

The connective tissue between the muscle fibres was very much increased and highly nucleated. This increase of perimysium and endomysium did not appear to be universal but was of a rather patchy distribution. It was most marked in the biceps (Fig. 2).

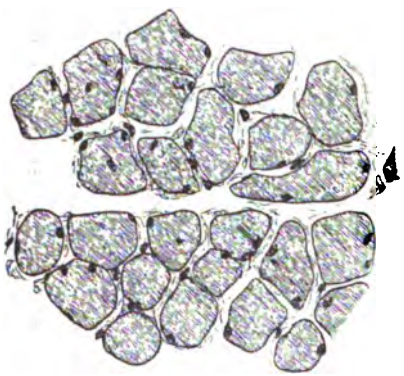

FIG. 1.—SECTION OF NORMAL MUSCLE FOR COMPARISON × 350.

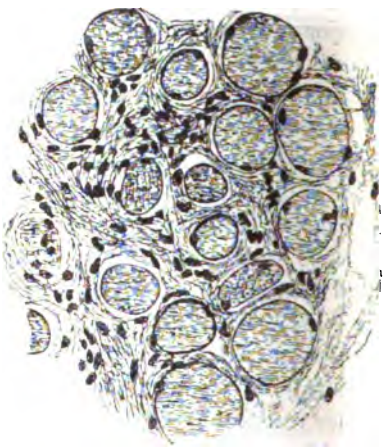

FIG. 2.—TRANSVERSE SECTION OF BICEPS × 350.

There were large deposits of fat between the muscle fasciculi, and to some slight extent also between the individual fibres. This fatty deposition was extremely well marked in

PLATE IV.—DR ROSE'S CASE OF PSEUDO-HYPERTROPHIC PARALYSIS.

From the hands on knees to the upright position. In the two lower figures, that on the left ought to show the hands of the supporting person, that on the right the chair grasped by the patient.

sections of the gastrocnemius (Fig. 3); it was of much less extent in those of the biceps.

The muscle fibres, despite the compression by the fibrous and fatty deposits, appeared to be comparatively healthy. Here and there, however, atrophic granular fibres could be seen, and many of the fibres had lost their characteristic cross

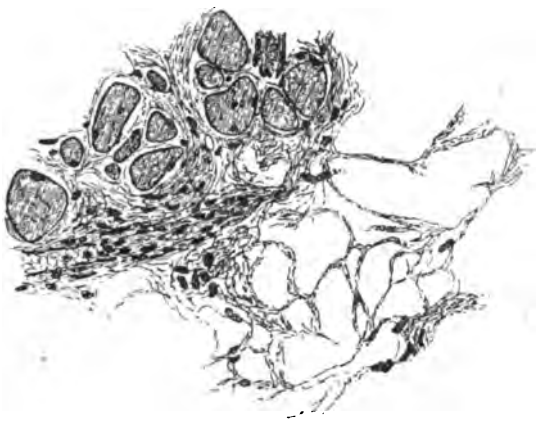

FIG. 3.—TRANSVERSE SECTION OF GASTROCNEMIUS × 350 (THE EMPTY SPACES WERE FILLED WITH FAT).

striation. The muscle nuclei appeared to be more numerous than normal.

My thanks are due to Mr A. W. Cassie for his careful notes of the case, to Mr W. Anderson for the series of excellent photographs, to Dr A. W. Mackintosh for the report on the electrical reactions, and to Dr G. M. Duncan for his report and drawings of the microscopic condition of the muslces.

A CLINICAL NOTE ON A CASE OF ECLAMPSIA AT THE SIXTH MONTH—RECOVERY—SUCCESSFUL LABOUR AT FULL TIME

Read before the Edinburgh Obstetrical Society

By MICHAEL DEWAR, M.D., C.M.,
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As a good many cases of puerperal eclampsia have been recorded during the past few years, and as its etiology and treatment have been fairly well discussed, a record of another

case seems to be a redundancy. Yet, after all, we know very little about it, and it is only when its grim presence comes suddenly before us that we realise our heavy responsibility and are impelled to record the facts, so that from a multiplicity of cases light may come out of darkness. You will therefore pardon me for laying a statement of this, my most recent case, before you.

The subject of the following notes is a married primipara, aged 28. She is one of a family of six, of whom four are alive, all females, two having died in infancy, a boy and a girl. The father died in 1879 of inflammation of the lungs. The mother and the three living sisters have all enjoyed good health. The mother had normal pregnancies and easy labours. Two married sisters have had nothing unusual in their married life. My patient has had no illness during her lifetime, with the exception of measles in childhood and whooping-cough at the age of twenty. She has not had scarlet fever. She is a well-developed young woman, bright and intelligent, and of a dark and pale complexion, and is in good circumstances as a working man's wife. Menstruation has always been normal. She never had fits of any kind up to the present illness.

During the first six months of her pregnancy she enjoyed perfect health, there being only slight sickness in the very early stage, and later on a little swelling of the feet and ankles with distended veins, more on the right leg than on the left. She passed the ordinary amount of urine daily, which was normal in appearance and had no deposit. The bowels were constipated. On the day of the attack she was so well that she was preparing to visit her mother in Aberdeenshire for a week's stay. Suddenly, at 6.30 P.M. on the 27th June, without the slightest warning of any kind, she took a fit, and before I reached her house she had had seven fits in less than an hour. On my arrival at 7.20 P.M., she had just had the seventh fit, and was lying on her left side, with the knees partially drawn up, quite unconscious, the breathing stertorous, the pupils contracted, and non-sensitive to touch and light and the face flushed. The skin of the body was moist, but not unduly so. The pulse was 120 of high tension. I could get no information as to the condition of the bowels or bladder, but on turning down the bedclothes I found that she had been passing urine involuntarily.

Within a few minutes after my arrival she had another fit, the eighth, in which her face was drawn to the right. It began with a long tonic convulsion, succeeded by a series of strong and rapid clonic contractions, involving the whole of the body. The attack lasted about three minutes, followed by the condition she was in when I first saw her. I first emptied the bowels with a soap and water injection, having to scoop out hard scybalous masses with my fingers. While engaged in this little operation, she had another fit of the same character, the ninth, which lasted over two minutes. After this had passed off, I introduced a catheter and drew off a little more than a tablespoonful of urine. The bladder had been practically emptied involuntarily. The urine was non-albuminous. I then examined *per vaginam*, and found the os closed and no discharge. On palpation the uterus was as it should be at the sixth month—no contractions—and on auscultation the fœtal heart sounds were distinctly heard. As she was seized with another fit (the tenth and the last on this occasion) shortly after, I sent for my friend, Dr Proudfoot. By the time he arrived, however, she was becoming conscious for the first time, and in the course of a quarter of an hour she was very much better, though dazed, and speaking as if she had not quite the control of her tongue. The tongue, on examination, was slightly abraded at the left side, but no blood or saliva appeared at the lips. We gave her a dose of bromide of potash and chloral, which shortly afterwards sent her off to sleep.

On my visit the next day, 28th June, I learned that there had been no more fits since I left the previous night. She was fairly comfortable, had slept pretty well, but was still confused and halting in her speech. The urine was plentiful, was passed voluntarily and was non-albuminous. The K.Br. and chloral mixture was continued. She went on in much the same condition till the evening of the 1st July, four days after the first attack, when she had a second series of convulsions, seven in number, of the same character. On my arrival after the second fit of this series, I injected 10 minims of tinct. verat. virid., and on this occasion tried to control the convulsions with chloroform. When consciousness returned after the seventh fit, I administered a dose of K.Br. and chloral as before and ordered her to have 10 minims of tinct. verat. virid.

every six hours. On this occasion there was a trace of albumen. On the forenoon of the 2nd July I found that she had passed a fair night. The pulse was 80, much softer in character, but intermittent. On making a vaginal examination the os was normal and closed, and no discharge. The fœtal heart sounds were distinct. I stopped the tinct. verat. virid. and gave her a mixture of the bromides of ammonium and sodium.

On the evening of the 4th July—eight days from the first attack—she had a third series of convulsions, three in number. As her people were getting accustomed to them, I was not sent for. I visited her on the 5th July, and found her again fairly well. No albumen.

From this day onwards she gradually improved—still somewhat confused in her mind, and the speech improving. I ceased my visits on the 11th July. The œdema and varicose veins were still present in both legs, more on right than left. There was no albumen in the urine on the last occasion examined.

On the 22nd September, almost exactly three months after the first series of convulsions, I was called to my patient at 7 P.M. On arrival I found her in bed, and received the report that she had been in labour since the forenoon. The os was well dilated, the bag of membranes protruding, and everything as it should be. As far as I could make out, the position of the presenting head was R.O.A. This was verified later on when the waters escaped. Labour went on uninterruptedly and was completed at 9.30 P.M. naturally by the birth of a fine healthy boy. The placenta was extracted in a few minutes, and was perfectly normal in appearance. The swelling in the ankles disappeared very soon after the labour was over. Her progress was favourable, and she was well and going about in a fortnight. I saw her two weeks ago, and with the exception of a slightly defective memory, she was well and feeling well. The urine was normal and non-albuminous. The baby is a very fine specimen.

Remarks.

The question may now be asked, was this a case of eclampsia? I would not like to be positive, but I think it was. I know that some observers maintain, or at least

assert, that it is no eclampsia without albuminuria. You will have noticed that there was no albumen during the first series of convulsions, only a trace during the second series, and no albumen during the third series. The legs and feet were œdematous, the right more than the left, but this was no doubt due to obstruction. The case *may* have been one of epilepsy, but there was no family history pointing to such a thing; there was no personal history, there was no aura of the slightest kind, there was no bitten tongue, only a slight abrasion of the side of the tongue against a sharp portion of a decayed tooth, and no frothing at the mouth. In the last case of eclampsia which occurred in my practice three years ago, previous to this, there was a large amount of albumen present, but the convulsions were neither so numerous nor so severe as in this case, and it ended in the birth of the fœtus at the sixth month and the recovery of the mother. Again, in another case about two years previous to the last mentioned, convulsions occurred about the sixth month, and on the second day labour came on with the birth of a dead fœtus and also recovery of the mother after some time. There was *no* albumen during the fits or afterwards.

With such an experience, I think that in the absence of a definite etiology and pathology of eclampsia, it is quite as incorrect to say that there can be no case of eclampsia without albuminuria, as it would be to say that ataxia without the Argyll-Robertson pupil is no ataxia. I would be inclined, therefore, to classify all cases of convulsions occurring during the puerperium as eclamptic, irrespective of the presence or absence of albuminuria, for as far as I have observed or read, it really does not much matter whether the convulsions be accompanied by albuminuria or not, as regards the safety of the mother or child. They seem to me to be both equally dangerous. That these convulsions cannot be entirely due to a condition of albuminuria with an excess secretion of urea and uric acid, is shown clearly by the fact that there are many cases of albuminuria in pregnancy, with swollen legs and puffy face, in which *no* convulsions occur during the whole puerperal period. If albuminuria had a proprietary right to eclampsia, every obstetrician would have to face a great many more cases of eclampsia in his practice than actually fall to his lot. There

are evidently, therefore, some subtle conditions, of which we are at present unaware, existing, or ready to be called into existence, by peripheral or other influences, which determine what cases are to be affected by eclampsia and what are not. We all know how sometimes the simplest case of labour in which the greatest precautions have been taken will go all wrong, while cases of version and instruments, which have undergone any amount of rough handling, and which have occurred in houses possessing not the best sanitary arrangements, never cost the medical attendant a moment's worry during the lying-in period. It is not enough to say that in these former cases it is septicæmia that does all the mischief. There must be something else which determines the septicæmia. There is the streptococcus behind, wherever it comes from, which is the initial cause. Again, it is a fact that only a certain proportion of cases of acute and chronic Bright's disease, where the urine is scanty and loaded with albumen, develop uræmic convulsions; and more especially in chronic Bright, the case might go on for months without the slightest hint of it.

In a great many cases of eclampsia, the urine, I believe, has been examined chemically, and the number of corpuscles and leucocytes in the blood has been counted, but I would like to ask if a systematic bacteriological examination of the blood in eclampsia has ever been made. I am not sure that it has, but perhaps someone may be able to put me right on that matter. It is quite probable that a toxin produced by chemical changes in retained fæces (and we know that constipation occurs as frequently in those cases as albuminuria) may be the determining factor of the convulsions in many cases, at least there is room for such a theory where albuminuria does not exist. Again, it is quite possible that a bacillus may be found, and be the initial cause of the convulsions, just as the earth bacillus is concerned in the production of tetanic convulsions. By way of supporting this view, we have recently had a diplococcus demonstrated as being present in acute rheumatism, a disease, the cause of which has baffled medical experts for centuries. I throw out the suggestion to those bacteriologists who have the time and the means to carry it out.

Then as regards treatment—chloroform seems to be the sheet-anchor for controlling the convulsions. I am not sure,

judging from my own limited experience, and from what I have read, that chloroform has very much effect for good. I confess that when I see a patient in the throes of a fit, and when evidently during the tonic and clonic spasms not a particle of air is entering the lungs, and the blood is becoming every second more and more charged with carbonic acid, I shrink from using chloroform ; while afterwards, in the comatose condition, I never can understand what good chloroform can do except to deepen the coma. I have never used morphia, and do not intend using it in any future case, as I believe that in albuminuria it is practically fatal, owing to its interfering with the bowel and kidney functions. I cannot speak of veratrum viride, except that in my case the heart became intermittent after the first few doses, when I deemed it advisable to stop it. As regards saline solution I have no experience, but I would imagine that while after a time it increases the quantity of urine, and thus clears out an excess of urea and uric acid, it must tend to increase the heart tension at first, and surely that is high enough in all these cases.

I believe that a little more of the expectant treatment, after attending to the bowels and bladder, with the administration of the bromides and chloral, is perhaps the best method of managing such cases. If there be no signs of nature having commenced premature labour, I would wait for a day or two at any rate before practising fœticide ; but if the os was opening up, and uterine contraction taking place, the sooner the uterus is emptied the better.

Meetings of Societies

Glasgow Medico-Chirurgical Society

AT a meeting on January 11th, Dr J. D. Nicoll showed as a fresh specimen a good example of a perfectly calcified mesenteric gland, which he had removed that morning from the abdomen of a patient on whom he was operating to relieve recurrent attacks of obstruction, characterised by vomiting, collapse and pain. The meso-cæcum was adherent on its outer aspect to the abdominal wall, and in examining the abdomen for further adhesions several hard masses were met with, of which the specimen shown was one.

1. Dr Walker Downie showed a variety of polypi removed from the naso-pharynx. There were specimens shown of the mucous polypus, the fibro-mucous polypus, and the true fibromata, with a brief clinical account of each case, and the necessary operative procedure. Twenty-one specimens were shown, forming a demonstration of great interest and value.

Dr Rutherford referred to the fact that cauterisation of the base of the tumours had been recommended, and said he had never known exactly what was aimed at, and did not think there was much evidence in support of the utility of the practice.

Dr Newman said that polypi in the naso-pharynx when removed did not recur. But that in the nares, when polypi were removed, other growths, hitherto hidden, appeared and took their place.

Dr Rutherford thought that this proved his point, that cauterisation of the base was of no use practically, although prescribed as the proper routine.

Dr Downie pointed out that the surgeon did not attempt to cauterise the exact base of a polypi, but used the cautery very freely over the neighbourhood of the growth, and this prevented fresh polypi growing from the mucous membrane.

Dr Rutherford was glad to have it clearly defined that such a general cauterisation was recommended, and not merely an application to the base of each polypus.

2. Dr Newman gave an account of a case of jaundice due to a large impacted gall-stone, which was removed by operation. The patient had been in Dr Middleton's ward, who said she was a woman aged 45, who had had jaundice 18 months ago, supposed to be due to calculus. She had got better of the first attack, but another appeared four months ago with jaundice and sickness, and a mass below the liver suggestive of a distended gall-bladder. There were not any gall-stones found in the motions at any time. Pain became severe, and there was deepening jaundice, emaciation, and pyrexia, and tenderness in the abdomen indicative of localised peritonitis. Dr Newman agreed to operate, and on incising the gall-bladder found it empty of bile, and occupied by a large calculus, two and a half inches in length. It was crushed and removed. At the apex of the gall-bladder there was a matted mass of connective tissue which precluded further exploration in that direction. During the next ten weeks bile only once passed into the bowels, and Dr Newman had resolved to anastomose the gall-bladder to the intestine, when suddenly a much better secretion of bile into the intestine occurred, and recovery ultimately ensued. The

abdominal fistula was now practically closed. No further calculus had been found in the motions, though they had been carefully searched.

Dr Clark thought it likely that some small calculus had blocked the common bile duct beyond the cicatricial tissue, and that it had escaped by the bowel.

3. Dr Newman gave a short account of three cases of renal hæmaturia: (*a*) from thrombosis in a case of movable kidney; (*b*) from torsion of the renal veins in a movable kidney; (*c*) from a malignant tumour of the kidney.

In each of these three cases the hæmaturia was alone observed; no other physical sign was made out.

In (*a*) the hæmaturia came on in June 1899, and lasted continuously for eighteen days, and then became intermittent. Exercise did not increase it, nor rest relieve it. There was nothing else found in the urine of abnormal character. Nothing could be felt on palpation owing to an abnormal configuration of the patient, by which the ribs closely approached the iliac crests.

The cystoscope revealed a healthy bladder, and blood issuing from the left ureter on two occasions.

On operation the left kidney was found rotated on its short axis, the upper margin being thrown forwards, and a mass of infarction in it was seen. The operation of nephrorraphy was performed. Blood was present in the urine for three weeks afterwards, and then disappeared.

(*b*) In this case there was hæmaturia in May 1899 after a slight fall, recurring in two to five weeks, and lasting four to nine days. Rest in bed caused the bleeding to disappear. There was slight renal pain. The patient was extremely stout, and palpation gave no information. Exploratory incision was made, and nephrorraphy performed, after the cystoscope had revealed blood escaping from one ureter. The kidney was found to be rotated, the upper part being thrown forwards. It was of a dark chocolate colour.

The operation was quite successful.

(*c*) This was an example of round-celled sarcoma of the kidney. The hæmorrhage first lasted for one month, was then absent for two months, and then became intermittent. There were no other symptoms. The kidney was situated very high up, and could not be palpated, but exploratory incision revealed the tumour. The kidney was removed and the patient did well for a day, but then sickness set in, and death occurred on the fourth day. There was no suppression of urine. Unfortunately no *post-mortem* was allowed.

These cases well illustrated some of the difficulties in diag-

nosis. The cystoscope made easy the limitation of disease to one kidney.

4. Dr Freeland Fergus described an easy operation for ptosis, which will be published at a later date.

Edinburgh Obstetrical Society

THE third meeting of this Society was held on the 9th January, the President, Dr R. Milne Murray, being in the chair.

It was feared that there might be a good deal of opposition to Professor Simpson's motion "that women should now be admitted to the Fellowship of the Society," but with strange irony the motion was carried unanimously. It will be interesting to observe whether full advantage of this privilege will be taken by the lady medicals.

Dr J. W. Ballantyne described an interesting method of graphically demonstrating the rate of fœtal growth. This clearly showed that the most rapid period of growth in both fœtus and placenta took place between the fourth and fifth months. During the last three months of intra-uterine life the placenta merely transmits nutrition to the fœtus and undergoes hardly any growth.

Dr Haig Ferguson exhibited a fibroid uterus removed by abdominal hysterectomy.

Dr F. W. N. Haultain read a paper on "Intra-peritoneal rupture of ovarian cysts, with special reference to operative treatment." He stated that rupture of such cysts was somewhat uncommon and proceeded to describe six cases; three of which were found to be torn at the time of operation, and in the other three there was a history of a previous rupture. In the majority of such cases no discomfort is complained of, though the cases described showed a marked difference in their clinical features. The accident is probably more common than is generally believed. This is due to the innocuous character of, and the slow escape of, the cyst contents. Rupture probably takes place in small cysts more frequently, and very likely before the days of laparotomy many large cysts would cure themselves by rupture. There can be no sudden gush of the cyst contents into the peritoneal cavity because of the continuous intra-peritoneal pressure. Dr Haultain recalled Palm's 25 cases of cyst rupture with 18 deaths, and Nepveu's 150 cases with 65 deaths. In such the contents must have been very irritating or even septic.

In discussing the causes of rupture, the author noted its frequency in gelatinous cysts because of the cyst wall itself becoming gelatinous and so easily rupturing. The contents in

these cases is very unabsorbable, and so we find this gelatinous fluid in the abdomen long after the rupture.

Course after rupture.—(1) In a certain proportion of cysts with innocuous contents, ready absorption takes place and the cyst may disappear permanently. This is specially seen in large cysts of the broad ligament, which are usually unilocular.

(2) In another series a ready absorption of the contents, which are non-irritating, takes place, but the cyst undergoes redistension or secondary cysts grow, and so we frequently find a reappearance of the tumour.

(3) If the contents tend to cause irritation, inflammatory adhesions form, and so the tumour is very difficult to remove later on. It is frequently seen that cysts have been repeatedly tapped and yet no adhesions have formed. In such cases the contents must have been innocuous. In other cases numerous adhesions have been formed without any pain or discomfort to the patient. These adhesions are chiefly between the tumour and the abdominal walls, and seldom to the intestines owing to their continuous motion. In those cases where little or no absorption takes place, the cyst may probably continue to secrete its contents and to discharge these into the peritoneal cavity.

(4) The contents may be intensely irritating and may cause peritonitis.

Treatment.—There can be only one opinion—an immediate operation in all cases, as the contents may irritate the peritoneum and give rise to adhesions though no symptoms may be present. The ruptured cyst should be removed as soon as possible. The sudden subsidence of a tumour should be a certain indication for operation. The difficulty of diagnosis is great where small tumours containing intensely irritating contents rupture. Such cases are very similar to rupture of the intestines. Laparotomy in such cases is exploratory. In some cases, from the free escape of fluid from the abdominal incision, it might be thought that the cyst wall had been incised, and cases have occurred where the parietal peritoneum has been stripped from the wall of the abdomen in mistake for the cyst wall. In such cases the author always enlarges the incision, and introducing the hand, finds whether it is in the general peritoneal cavity or in a cyst before attempting to separate any part.

Professor Simpson, amongst other remarks on this paper, said that malignant disease of the peritoneum was a somewhat frequent occurrence after operation for ruptured cysts, and therefore *perfect* cures could not be guaranteed. Drs Berry Hart, Foulis and Haig Ferguson also took part in the discussion.

Dr Berry Hart read a paper "On uterine retraction, with

special reference to the mechanism and management of the third stage," which will appear in full in the *Scottish Medical and Surgical Journal.*

The Forfarshire Medical Association

AN ordinary meeting of the above Association was held in the University College, Dundee, on Thursday, 13th December 1900, at 8.30 P.M. Dr C. S. Young, Vice-President, in the chair.

Dr Mackie Whyte read a paper on "Recent researches on alcohol and their effect on treatment." He adhered to the views of Schmiedeberg in regarding alcohol not as a stimulant of functional activity but as a paralysing agent. This action on the brain and on muscle was gone over at some length, reference being made to the work of Kræpelin Destrée and others. There was no proof of a stimulating effect on the heart. Binz's experiments on the effect of alcohol on respiration were discussed. The effect of alcohol on the tissues was shown in various ways to be deleterious, the proof that it is a protoplasmic poison being considered to be fairly complete. While alcohol taken in moderate amount is to a great extent oxidised, its food value must be largely discounted by its other effects.

Our knowledge of metabolism is very far from being complete; what we want to know in regard to alcohol is what it does before it is transformed into water and carbonic acid. The bearing of these views on the treatment of various classes of disease was next gone into, and while it was true that alcohol was very much less frequently given than formerly, a still greater restriction seemed to be indicated. Diseases of the nervous system, of the digestive tract and liver and of the kidneys offered little scope for the use of alcohol. Where not positively deleterious its sedative or narcotic effect was too often risky. The popular use of gin as a diuretic should be protested against. The action of alcohol on acute febrile and infectious disorders was gone into at some length, pneumonia being taken as a convenient type. Aufrecht of Magdeburg, the Bonn Clinic, Kassowitz of Vienna and Barr of Liverpool were quoted as disapproving of the giving of alcohol unless in some exceptional conditions, and in Dundee Royal Infirmary it was found that even chronic drinkers got on more satisfactorily without alcohol than with it.

The Chairman in the discussion which followed pointed out the interest such a paper had and referred to the effect of alcohol on the circulation, and stated that it was his practice to use alcohol chiefly in tiding over a crisis.

Dr J. W. Miller said that he agreed in almost everything with the paper. In his own practice he had been steadily diminishing the quantity of alcohol prescribed for patients, especially in acute cases such as pneumonia and fevers. As an indication of the practice thirty years ago he quoted from a record of typhus cases during the term of his physicianship in the Dundee Infirmary in 1868. In the total of 884 cases, 51 reached a maximum of 12 ounces of alcohol in 24 hours, and in 3, 18 ounces were given. These were cases of great severity which one might have expected to prove fatal. 12 of the 51 recovered. In pneumonia he never used alcohol largely and was of opinion that it should be used only in the strictest moderation.

Dr Miller then said Dr Whyte had referred to the danger of discontinuing alcohol suddenly in those cases where its bad effects are beginning to show themselves, but in a twenty-eight years' experience of prison practice in which alcohol is at once stopped on admission, he had not found such a large number of cases of delirium tremens as one would expect if the practice referred to were dangerous. The popular use of alcohol was in every way to be condemned. We all know how common is the pernicious practice of giving alcohol to young females in dysmenorrhœa.

Dr Sinclair in his own practice adopted pretty much the same plan as Dr Miller, the effect of alcohol being very carefully watched, the doses small and carefully measured, the effect carefully watched on the pulse and tongue, the earliest hint of narcotic effects being especially carefully watched. In pneumonia the balance of evidence was entirely in favour of the withholding of alcohol until the crisis, and in the majority of cases even then many cases might do better without than with it. As regards the effect upon healthy individuals the practice of most was to take rather small than large doses, and reserve it until the end of the day, when its tranquillising effects after a hard day's work were undoubtedly beneficial. He was perfectly convinced of the absolute harmlessness of omitting alcohol altogether in the case of the majority of healthy individuals. In regard to the phthisical cases he entirely agreed with Dr Whyte; phthisical patients who had been intemperate generally go down-hill very rapidly, but with all deference he thought there was another side to the question. It was, he said, very well known that if a patient with a tendency to phthisis developed the gouty habit it is very hostile to tuberculosis. In the case of young children with a tendency to waste and to take catarrhs readily, a little alcohol disguised with bitter infusion so that it should be disagreeable is of distinct advantage in promoting digestion and assimilation. Obstinate neuralgias common

in the aged are treated with advantage, not only with quinine, but with a modicum of alcohol along with it. He also thought that ether from the laboratory was not the same as volatile ethers in wines after fermentation and in bottle, and further he thought there were two periods of life when its use was dangerous for medical men to prescribe, and that there was a steady trend of opinion in this direction. The first was the change of life when women were inclined to give way to intemperance, and the second in young persons of both sexes when character was in the formative stage between the ages of puberty and 20 or 21.

Professor Marshall agreed that alcohol was a protoplasmic poison, and consequently practically toxic to all forms of tissue activity. It is not a stimulant to the brain, and there was no scientific evidence to show that the heart was stimulated by alcohol; if it did have any effect it was an indirect one through the stomach. He did not think Dr Whyte had laid sufficient stress upon its local effect upon the alimentary mucous membrane. He thought that alcohol had a beneficent effect upon the digestion and did assist the assimilation of food. Alcohol is also a food sparer. It can replace to a certain extent some of the carbohydrate of the food. It is absorbed readily and easily broken up in the system, but its power in this direction is limited.

In regard to the therapeutic use of alcohol he felt strongly that far too much was used in practice, but as a hypnotic he did regard it as one of the least harmful, and in certain gastric conditions he believed it to be of value. He laid particular stress on individual peculiarities towards the effect of alcohol. On the whole he thought it ought to be regarded as a drug and not as a food or poison except in a limited sense.

Professor Stalker considered that there was no shadow of proof that alcohol was a cardiac stimulant. He would be inclined under any circumstances to give a pneumonia patient the chance of recovering without alcohol. As a hypnotic he would use it in certain circumstances, and considered it the safest with children. He did think, however, that it would be a very hard thing to give up the dose of whisky in cases of advanced phthisis and cancer.

Dr Pirie spoke of the action of moderate doses of alcohol on the body as being described in most contradictory terms by physiologists. He considered that until physiology could speak with a more certain voice treatment of disease by alcohol must rest on a very insecure foundation, and indeed was dependent mostly upon clinical observation, which was steadily limiting the amount prescribed in many diseases and abolishing it altogether in some.

Drs Rogers, M'Vicar, and others having spoken, Dr Whyte then replied. In his reply he stated that the extreme physiolo-

gical dose was put down as 2½ oz. of alcohol, and that there was now a tendency to diminish and bring this down to about 1 oz. as the amount which a man can safely from day to day indulge in without producing for many years those degenerations which are so apt to come on as one gets on in years, whether teetotal or not. He should not expect food from larger doses than those diluted and given over the twenty-four hours. He thought that the fact of alcohol being a food sparer was of very little importance. What we wanted to know was what were the other effects of alcohol; if it is burned up in the body, is it or is it not, as Schafer says, a deleterious drug? He held it was. Professor Marshall said that he assumed it was a protoplasmic poison, that seemed to him to do away with its food value.

Recent Literature

CRITICAL SUMMARIES AND ABSTRACTS

MEDICINE

GASTRIC HYPERACIDITY—HYPERCHLORHYDRIA—AND ITS DIETETIC TREATMENT

By WILLIAM RUSSELL, M.D., F.RC.P.Ed.,
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NOT many years ago the conception of acid dyspepsia was very different to what modern methods have disclosed. The acidity was then attributed to fermentations of the food in the stomach, caused by yeasts or bacteria. It was recognised that the starchy foods specially favoured the production of the condition, and the explanation given was that the sugar formed from the starches encouraged the growth of the organisms which produced the supposed fermentations. The acids supposed to be present were mainly lactic, acetic, and butyric.

Knowledge of gastric digestion and of the chemistry of its disturbances have advanced greatly since the days referred to. It is now known that the old idea was in a very large number of cases wholly wrong; and that the whole idea of fermentation was based on a misconception of the acids which were present. As methods of examining the gastric contents were introduced and elaborated, it became apparent that much of the acidity from which people suffered was not due to the presence of such organic acids as have been specified, but resulted from an excessive secretion of the acid normally produced during the process of gastric digestion.

It is to this condition that this Summary is devoted; and

to which the term *Hyperchlorhydria* is properly applied. The term is not in universal use in this country yet, and there are many practitioners who, if not altogether unacquainted with the condition, have but a vague notion of its nature.

Hyperchlorhydria is a much more frequent condition than is commonly supposed; some observers put it at a fourth of all the cases classed under indigestion. We should put the proportion much higher in this country, but this point is likely to remain undetermined for some time, as it is impracticable to get a long series of cases of indigestion to submit to methodical removal of part of the stomach contents for analysis.

Clinical History.—The mode of onset varies in different cases: in some it is sudden, in others slow and insidious. When the latter, it begins merely as a sense of uneasiness. When the condition is fully developed, the symptoms are, in a large proportion of the cases, typical and characteristic, but this by no means can be said of all. The symptoms which may be regarded as pathognomonic are pain coming on from one to three hours after a meal and increasing sometimes so greatly as to compel the patient to seek the recumbent posture. The pain is referred to the upper part of the abdomen, the epigastrium or either hypochondria, and there may be epigastric hyperæsthesia. With the increase of pain there is heart-burn or pyrosis and a feeling of distension. The eructation of some mouthfuls of acrid material gives relief, whilst in some cases there is active vomiting until the stomach is completely emptied. The symptoms are usually relieved, indeed they, as a rule, entirely disappear, if another meal be taken, or a glass of milk, or in some cases any bland fluid, or a full dose of an alkalie. While the foregoing symptoms may be taken as warranting a decided diagnosis, there is a considerable percentage of persons in whom the symptoms are not nearly so pronounced, and yet who experience much physical and even nervous discomfort from the abnormal state of their gastric digestion. In them certainty of diagnosis can usually only be reached by the chemical examination of the gastric contents. Schüler even holds that the diagnosis of hyperchlorhydria does not rest alone on ascertaining the amount of acid secreted; but in the facts (1) that the digestion of starch is shortened, as shown by the fact that iodine gives a blue reaction with the gastric contents, and that there is an abnormally small amount of starch derivatives present; (2) that there is further an increase of stomach contents after the test meal, as well as (3) a marked lowering of the specific gravity of the filtered stomach contents. He takes these as evidence of hyperchlorhydria even when the estimation of the acid does not appear to indicate it. This condition has been called by Strauss *Hyperaciditas larvata.*

Pathology and Etiology.—It may be taken as definitely settled that the cause of the discomfort and pain in hyperacidity is due directly or indirectly to the free hydrochloric acid present in the stomach. It is universally known that the gastric secretion contains, amongst other chemical substances, hydrochloric acid, and that this acid, in the process of gastric digestion, combines with the proteids of the food. In hyperchlorhydria an excess of acid is poured out, with the result that part of it remains free, that is, does not become combined with proteid. Combined acid does not give rise to the symptoms of hyperchlorhydria. The existence of free acid can be determined by several methods. This free acid explains some of the more marked clinical and therapeutic phenomena; it explains the intensity of the symptoms at the acme of gastric digestion, that is, when the acidity of the gastric contents is at its maximum; it explains the relief obtained by diluting the gastric contents, by taking food which can combine with the free acid, by taking alkalies which combine and thereby neutralise it, or by the eructation of some of the hyperacid material.

Hyperchlorhydria is regarded by Boas, Ewald, Hemmeter, and others as a gastric neurosis; Van Valzah, Nisbet and others dispute this. It may be conceded that there is a neurotic factor in many cases, but to designate them all as "nervous dyspepsia" is, we think, entirely misleading. Symptoms may accompany, or be the result of excessive brain work, of mental strain or worry, or of insomnia; but after that it can be asked, whether the symptoms are due to increased acid secretion, to hypersensitiveness of the gastric sensory nerve filaments, or to a combination of these? There is little doubt that in many cases there is a combination of the two factors, but were it not for the hypersecretion there would not be pain. This is shown by the immediate relief which usually follows the removal or neutralisation of the acid. How the nerve influences determine hyperacid secretion is open to question, but we have no doubt there is in some cases a distinct relationship. These may therefore be regarded meanwhile as neurotic. The possibility, however, must not be ignored that central nerve perturbations may but precipitate a dyscrasia which manifests itself in this special way, in this particular organ in one set of people.

Even assuming that, from some one or other point of view, all cases might be regarded as neurotic, there is a factor to bear in mind which permits of a division of the cases into primary and secondary. The primary are those in which there is some direct local irritant, producing a hyper-irritability of the nerves, while the secondary are the cases in which there is some other part of the body affected. A hyperchlorhydria of the former

class may be the result of a prolonged error in diet; of the second class it might be caused by systemic intoxication, or some morbid constitutional state.

Dietetic Treatment.—This section of the subject under consideration is somewhat complex, and the recognised authorities are not agreed. There are, however, certain ascertained facts. It is well known that in hyperchlorhydria the digestion of starch in the stomach is early arrested; in other words, the amylolytic stage of gastric digestion is shortened, owing to the ptyalin being rendered inert or destroyed by the excess of acid. This is the explanation of the amylaceous dyspepsia of which we hear a good deal, and which is often recognised, although of its true significance there may be no correct idea. Some people even suggest that this arrest is of little consequence, as the starch passes into the duodenum to be acted upon there, and in the small intestine generally, and finally converted. This may be so in fairly normal digestion; it is certainly far from the truth in hyperchlorhydria. The retention of the undigested starches by the hyperchlorhydria stomach is a most important factor in the case. Based upon what we have said, two lines of treatment are adopted: the one is used with a view to using up the excessive gastric secretion, by giving abundant proteid food, while the carbohydrates are reduced to a minimum and given in a readily digested form. The other method is based on the hypothesis that the more proteid is taken the greater the secretion of acid; and that to correct the hyper-secretion, patients are best treated by a diet consisting largely of carbohydrates.

Von Sohlern, Hemmeter, Rosenheim, and others advocate the carbohydrate line of treatment; Boas, Penzoldt, and others adopt the proteid method; while others, as Riegel, compromise the matter by giving both kinds, but lay stress on the importance of both being given in an easily digestible form.

Underlying this divergence of opinion is the question, whether proteid diet stimulates to greater acid secretion than a carbohydrate diet. Meyer has anew examined this point, using plasmon and wheat meal in amounts of equal caloric value for his investigations. He assumed that an indication for diminishing proteid food in hyperacidity would first be seen if it were proved that, after a long continuance of food poor in albumen, the stomach reacted with less secretion of hydrochloric acid. To determine this point he fed three persons with vegetable diet for fifteen days. After fifteen days he added flesh three or four times daily, without any diminution of the other food stuffs given. We need not here go into detail. Briefly, the results he obtained were, that a food poor in albumen

did not diminish, but might even increase the acidity; and he failed to attain any lasting influence on the secretion, and therefore concludes that there is no ground for confining the diet to carbohydrates. Meyer's observations bring out clearly two points of practical interest, confirmatory of clinical experience, namely, first, that after carbohydrate food the hyperacidity comes on much sooner than after proteid food; and secondly, that the exhibition of proteid in combination with carbohydrate is of value in giving the acid which is present material with which readily to combine. By this means the amylolytic processes are favoured and prolonged.

With reference to the larger question we do not think Meyer's observations can be accepted as of much value. Observations of the kind he made would have to be carried on over a much longer period of time to allow of deductions to be made which could be accepted as reliable guides. Hemmeter's experiment is always to be recalled in this connection: he brought up two puppy dogs, the one largely on carbohydrates, the other largely on proteids, and at the end of a year found that the former secreted less acid than the latter. Meanwhile the proteid treatment is popular because of the speedy relief it often affords; on the other hand von Sohlern and others still adhere to their contention that the carbohydrates have a distinctly beneficial effect.

The question of diet depends very much on the severity of the condition, and in a very important measure on the type of carbohydrate which is used, and also on the skill with which the whole diet is regulated in individual cases. A mixed diet does admirably in many cases if the proteid be given in an unirritating and easily digested form, and if the carbohydrate be given at the right time and in a form capable of rapid transformation. The writer of this summary has been recently using carbohydrate foods, known as *Veda* foods, with results which have been highly satisfactory.

One further point of interest in connection with diet in hyperchlorhydria is the action of fat. Bachmann has lately shown by investigations on persons suffering from this condition, that fat exercised a restraining influence on both the total acidity and the free hydrochloric acid, while not interfering either with the digestion of starch or the secretion of pepsin. Strauss has also shown the beneficent influence of fat in these cases.

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SURGERY

GENITO-URINARY SURGERY

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THE surgery of the ureters is of comparatively recent date. A healthy bladder is their protection against disease from the distal or vesical opening, just as a healthy deep urethra protects the bladder against extension of inflammatory affections from the penile portion of the urethra. Further, the power of one kidney to do the work, when necessary, of two, minimises the harm of one ureter being imperfectly developed, or of injury, or disease, or obstruction in its canal. Blocking of one ureter by a stone may give rise to little inconvenience when the other kidney and ureter are normal, but if the second ureter be imperfectly developed, diseased, or obstructed, then the condition is very serious. Calculous anuria is at all times grave. Most usually it is due to a calculus or calculi in each ureter, but it may be from a calculus obstructing the ureter of one kidney, compensatorily enlarged, which has been doing the work of both kidneys, the other being diseased. So much may be said to partly explain why ureteral surgery perhaps lags behind advances made in the treatment of organs or canals more vital to human life. Just, however, as advances in surgical technique have been made in relation to the alimentary tract, so during the past few years great advances have been made in ureteral surgery, and such advances have been most beneficent in the conservative surgery of the kidney. In the future, in all probability, fewer kidneys will be excised for conditions such as hydronephrosis, secondary to faults in the kidney, pelvis or ureter. Ureterectomy has been occasionally carried out. Ureterotomy for the removal of calculi impacted in either the abdominal or pelvic portions of the ureter, has frequently been successfully performed. Ureteral grafting has also an important place in surgery in the treatment of persistent urinary fistulæ. Mr Reginald Harrison has brought a ureter out on the loin in a case of ectopion of the bladder, and an immense amount of work and ingenious contriving has been carried out to devise methods whereby the ureter or ureters might be grafted into the bladder, or rectum, or into the large or small intestine. Where it is possible to bring the ureter into the bladder that procedure is the best, but when this could not be done the other routes have been chosen, and much success attained by, for instance, Maydl, Beck and others. M.M. d'Urso and Fabii of Rome have recently conducted an extensive experimental research in dogs upon the subject of uretero-enteroplasty. They interposed portions of intestine in some instances, and in others

portions of the uterus, between the ends of the ureter, and found the procedure practicable. As a result of their experiments, they conclude that in the future this procedure will be used in man. Experiments conducted by them previously showed, they state, that the organisms contained in the intestine had no deleterious effect upon either the kidney or bladder. The scope of this method seems very limited; but it is worthy of note that successful experiments have been made (*Ann. des Mal. des Org. Urin.*, Nov. 1900).

Ureteral Catheterisation has during the last year or two been prominently before the profession. Its use makes it possible to analyse the excretion from each kidney, and may be of much importance, not only in diagnosis but also in prognosis, in cases where it may be needed to definitely show which kidney is the seat of disease. If operation be indicated in treatment, it may give information regarding the capability of the other kidney to take up a compensatory action. This is necessarily of the first importance when nephrectomy is under consideration. M. le Dr Géza de Illyés, in an article entitled "Catheterisation of the Ureters, with some new methods of diagnosis of diseases of the Kidneys" (*Ann. des Mal. des Org. Urin.*, Dec. 1900), gives a short resumé of the history of the varied endeavours to obtain the urine from the individual kidney, before the introduction of the endoscope and method of Kelly of New York. The rapidity and success of that method in the hands of Dr Kelly is admirable; but Dr Illyés prefers the cystoscope introduced by Nitzé, or that of Albarran, both of which are modifications of the cystoscope introduced by Brenner. In Brenner's cystoscope the ureteral catheter is on the convexity of the instrument, while in each of the others the catheter is in a canal on the concavity that is on the same side as the light and lens. The two chief disadvantages of Kelly's endoscopic method are referred to by the author: (*a*) the necessary dilatation of the urethra; (*b*) that if the bladder wall be inflamed, and the cavity not readily distended by air, the view is not good, and manipulation is not easy. This is so; but, undoubtedly, in favourable cases the method is most satisfactory, while in cases where the bladder is inflamed, the adoption of ureteral catheterisation is fraught with danger from septic infection of the ureter. With the ordinary cystoscope to pass a bougie or catheter into the ureter in the female is easy, and as far back as 1893 I used the method in a case of suspected stone impacted in the ureter.

Sterilization of the instruments, etc., is important, and to this Dr Illyés alludes, remarking that the cystoscope is injured by boiling or heat so that antiseptic lotions must be substituted.

There is no difficulty in seeing the ureter, but some difficulty may be experienced in passing the catheter into the ureter as the mucous membrane may be folded before the instrument when the attempt to pass it in is made. When, however, the point is engaged, the further passage, even into the pelvis of the kidney, is easy if no abnormality be present. After introduction the catheter is tied in by fixing the outer end to the pubic hair in the female, to the penis in the male. The urine from the catheter is collected in one vessel while the urine from the other ureter collects in the bladder and is afterwards drawn off or passed into a separate receptacle. In this way a relative analysis can be made regarding quantity, specific gravity, etc.

In addition to this analysis it is recommended that the relative quickness, quantity and progress of the elimination of *methyl blue* be estimated. Two or more drachms of a 5 per cent. solution are subcutaneously injected, and those points regarding the excretion noted. Further, the author alludes to the method of M. Koranyi to determine the time of coagulation of blood when mixed with the urine derived from each kidney.

At the end of this paper a resumé of twelve cases treated by M. Illyés is given; the analysis of the urine in two of these will serve to illustrate the method.

I. Bilateral renal tuberculosis.

	Quantity.	Sp. gr.	Reaction.	Urea.
Left K.	880 c.c.	1008	alkaline.	·1280 per cent.
Right K.	1030 c.c.	1013	neutral.	·37 „

Methyl Blue.	Appeared.	Progress.	Duration.	Intensity.
Left K.	1 hour.	Intermittent.	66 hours.	5°
Right K.	1 hour.	„	56 hours.	9°

Case V.—Cancer of Right Kidney.
Right K. in 12 hours 8 c.c.
Left K. in 12 hours 355 c.c.

In conclusion the author states that catheterisation is not dangerous and the catheter may be left *in situ* without inconvenience for days. To this we must demur unless the case be one in which the bladder is free from organisms. The risk of keeping a catheter *in situ* for hours must be, we believe, not devoid of risk in any case, and in some cases must be dangerous. It is well known, and accepted by most surgeons, that a catheter tied in the urethra is apt to be followed by cystitis, and in the same way we think a ureteral catheter may give rise to a septic pyclitis. In a small number of cases ureteral catheterisation has an important place, but in the majority of kidney cases which have reached a stage for operative interference we think

it an unnecessary and risky procedure. In cases of renal hæmaturia or pyuria the observation of blood or pus coming from the ureter suffices for diagnosis, and it is only in those instances when the compensatory power of the other kidney is questionable that it is necessary to catheterise the ureter. The ureter to catheterise is that coming from the diseased kidney, not that from which normal urine is passing. If injury results from the catheterisation, it will be injury to the already affected kidney and not to that one upon which the patient must depend for compensatory excretion of urine if nephrectomy be eventually performed.

OBSTETRICS AND GYNECOLOGY

THE TREATMENT OF INFLAMMATORY AFFECTIONS OF THE UTERINE APPENDAGES

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1. *Conservative Treatment.*—During the past ten years operative gynæcology has been characterised by an ever increasing tendency to conservatism. As a result of this change we are now able to save organs, partially or completely, which fifteen years ago would have been extirpated without hesitation. The removal of a pyosalpinx from one side only is, at the present day, regarded as a justifiable course; and it is no longer held essential that the opposite appendages must be removed at the same time on the ground that the disease may recur on the unaffected side. That such a line of treatment is correct has been abundantly proved by the frequent occurrence of pregnancy following on the unilateral removal of diseased appendages. In support of this method Dudley (*Medical Record*, 1895) reported sixty-three cases, and in twelve of these pregnancy followed the conservative treatment. Küstner (*Inaug Dissert.*, 1897) likewise from fifty-two unilateral operations observed pregnancy follow four times. Lawson Tait (*Brit. Med. Jour.*, 1887) out of twenty-six unilateral operations noted pregnancy follow in three cases. Schröder, Martin and Polk must be regarded as the pioneers of conservative gynæcological work. Schröder pointed out as his reason for retaining part of the ovary, the preservation of the function of ovulation, "even if it were accompanied by but a theoretical possibility of conception" (Kelly). He regarded the retention of a piece of ovarian tissue of vital importance in order to avoid melancholic symptoms, so frequently produced by an induced menopause. If it be further proved that an internal secretion by the ovaries

prevents the occurrence of climacteric symptoms, then this would strengthen the claims for conservative treatment of inflammatory ovarian affections. It is now accepted as a general rule that adhesions to ovaries and tubes no longer constitute *per se* a reason for the removal of these organs. Likewise in cases of hydrosalpinx where the tubal wall retains its normal epithelial covering, the function of the tube may be regained by evacuating the contents by simple incision.

Hermann (*Zeitschrift f. Gynæk.*, Band 42, Heft 2) tabulates thirty-four cases of pyosalpinx treated by conservative methods at the Breslau Klinik. He finds that recent observations go far to prove that death from pyosalpinx is less frequent than previously believed, and he compares the high mortality of 50 per cent. quoted by Lawson Tait in 1884 (*New York Med. Jour.*) with Routh, who believes that 4 per cent. is a fair average. He also mentions that in one hundred *post-mortem* examinations there were seventeen cases of diseased tubes, but in no case was this the cause of death. Authorities differ as to the possibility of spontaneous cure. Pozzi, for example, regards it as a very rare occurrence, and he holds that pyosalpinx can only be cured by extirpation. Schauta (*Wien Gynæk. Congress*, 1895) likewise stated that tubal swellings of the thickness of a finger require radical treatment. Martin (*Krankheiten d. Eileiter*, 1895) thinks that all cases of acute salpingitis may be cured by conservative means, and that even in cases of pyosalpinx restoration of function can occur so as to permit of subsequent pregnancy. Küstner (*Deutsch Med. Wochenschf.*, 1895) emphasises his conservative standpoint, and shows that dilated tubes may functionate normally after this treatment. Hermann has collected material that justifies him in maintaining that—

(1) A certain percentage of diseased appendages can, without any operation, be so far cured as to retain their function.

(2) That collections of pus in the tubes may be removed without radical treatment.

(3) That in tubal affections demanding a unilateral operation the appendages on the opposite side may retain their function. Dührssen (*Archive für Gynæk.*, Band 60, Heft 3) advocates the treatment of pyosalpinx and pyovarium by vaginal incision instead of the more radical method of extirpation of uterus and appendages so strongly recommended by Péan, Segond and Landau. He describes in detail eighteen cases so treated. The possibility of treating accidentally a suppurating dermoid tumour is regarded by him as no drawback, for the condition is thus recognised from the nature of the contents and the tumour removed by abdominal section. Perhaps the most important recent authoritative contribution on this question is that of

Veit in his encyclopædic work on gynæcology. Here he points out the importance of strict prophylaxis, especially in gonorrhœal cases, which, however, is not always easily attainable.

A strong advocate of conservatism, he first emphasises the necessity for rest, sexual and physical. In better class patients he attains this end by sending them to such resorts as Franzensbad or Marienbad.

Although he believes in the virtue of mud baths, yet he attributes the relief from pelvic pains more to the physical and sexual rest obtainable by such a change. Of course only a limited number of patients can avail themselves of such treatment, but Veit believes that in hospitals similar methods might be employed, as rest in bed, glycerine or ichthyol tampons, and laxative medicines. He points out the uselessness of patients being allowed to carry out this treatment for themselves. If left to the patient it will be done irregularly.

Electrical treatment, although useful in some pelvic inflammatory conditions, is best avoided in tubal cases. The removal of adhesions by abdominal or vaginal section is of great service, provided a subsequent fresh infection can be prevented, and Veit quotes Hadra's results from this line of treatment. On account of the risk of setting up acute peritonitis he rejects Schulze's method of separating adhesions, and for the same reasons he does not favour massage. Vaginal puncture of the tubal swelling is regarded by Veit as an abandoned operation, and on account of the difficulty of obtaining satisfactory drainage in bi-lateral tubal disease, he is no advocate for vaginal incision, even as a temporary line of treatment. Incising a tubal swelling and suturing the edges to the vaginal wound, as recommended by Skutsch and Martin, increase the danger of peritoneal infection, and for this reason will probably never become a popular mode of treatment.

2. *Radical Treatment.*—With regard to operative treatment Veit looks upon vaginal extirpation of the uterus as introduced by Péan, merely as a makeshift in cases where it is not possible to remove, at the same time, the diseased tubes. The removal of the uterus with the diseased tubes is likely to become more general, greatly owing to the improved technique of this operation, due to Doyen and others. Great diversity of opinion, however, still exists as to the extent and limitations for this line of treatment. In this country it has so far received but scant recognition and limited application. Veit has found that the retention of the uterus after removal of diseased appendages by castration is so frequently followed by leucorrhœal discharge, bleeding or abdominal fistulæ, that he is gradually coming round to the more radical operation; but he does not accept the

extended indications for this line of treatment given by Leopold, Doyen and Landau.

Although the technique has been almost perfected, yet there are dangerous complications apt to arise in the course of the operation. Of these, the most important is the uncontrollable bleeding (the result of tearing the tube during separation), the arrest of which may demand immediate abdominal section.

The abdominal radical operation, which has been more recently introduced, has the advantage over the vaginal operation in giving the operator a better view of the affected area. The technique is not more difficult and the immediate results are quite as satisfactory, although there has not been time to compare the permanent results with the longer established vaginal operation.

DISEASES OF CHILDREN

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The Treatment of Influenza in Children.—Influenza is prevailing with great severity in New York at present, and it is interesting to meet with a timely lecture on its treatment in children by so distinguished an American physician as Dr A. Jacobi (*Medical News*, Dec. 15, 1900).

Of the prophylaxis of the disease Dr Jacobi is not very hopeful. It can only be efficiently carried out in exceptional cases. He thinks it worth while, however, to have disinfectants applied to expectorated matters, and to towels, handkerchiefs, and other contaminated objects. It is also advisable that the other children in the house, as well as the patient, should use an antiseptic mouth-wash, and, especially, that they should have regular irrigation of the nasal cavity carried out. This last is useful, not only because it keeps the mucous membrane in good condition, but also because it removes the accumulated mucus which is thought to predispose to taking infection. Little faith can be placed in medicinal preventives such as quinine and cod-liver oil.

In the management of this disease we have no specific, and we have to trust to "rational hygienic and symptomatic and sustaining medicinal treatment" only. The patient is to be put to bed in a warm room, and a dose of calomel given to start with, in order to clear out "microbic and toxic ingesta." At first, the diet is restricted to milk, broths, and farinaceous foods, but later eggs are given. Alcohol is rarely advisable; it is not

required early, as in typhoid and diphtheria, but it may be useful during convalescence if progress is slow.

The treatment of the pyrexia is very important, because, in the young especially, a protracted fever deteriorates the tissues and exhausts the heart and brain. The external application of cold water, in baths or packs, is inadmissible. Not only is this found to increase the irritating cough which is often present, but the tendencies which exist to bronchitis, to copious perspiration, and to heart-failure, are all strongly against it. Warm baths may be usefully soothing when there is much pain or restlessness; and a hot bath may help in an occasional collapse.

Various drugs are of great use in treating the pyrexia, but they must be used with discretion and with due regard to the patient's idiosyncrasies. The authorities are mostly agreed in recommending quinine. Antifebrine (acetanilid) Dr Jacobi has come to regard as a poison which should never be prescribed. Of similar substances he greatly prefers phenacetine (gr. $\frac{1}{4}$ to $\frac{1}{2}$ for infants), except in cases where a soluble drug is needed, as for subcutaneous or rectal injections. In these he gives antipyrine. Salipyrine and salophen are also valuable.

It is important, however, if there is the least threatening of any of the nervous symptoms which are so common in influenza —from mere languor to heart-failure—that any antipyretic given should be accompanied by a stimulant. Alcohol, as already said, is not much recommended, but strychnine is useful; and Dr Jacobi has found a number of less commonly used stimulants of the greatest value. Of these he mentions sulphate of spartein, camphor, and salicylate of sodio-caffein. This last, of which grs. iii. to x. may be given in the day, he regards as particularly suitable. Another excellent stimulant for children with serious collapse and heart-failure from influenza, or from any other cause, is Siberian musk (10 per cent. tincture). Of this he gives 5 to 10 minims every half-hour until from six to twelve doses have been taken. Given along with large hot enemata, musk has stood him in good stead in many a trying emergency, and, *from fifty years' experience*, he strongly recommends it.

When severe vomiting sets in in influenza, feeding by the mouth should be stopped altogether for a while; but after a short time nutrient enemata may be begun. Freely diluted alcohol, peptones, and liquid albumins are readily taken up by the colon; while peptonised milk, eggs, broth, and a certain amount of starch, are less fully absorbed. The water in the injection always supplies a want to the system. Even in very young infants nutrient enemata may succeed if introduced carefully by an irrigator which is not raised higher than a foot above the anus. Morphine is the most useful drug in the

treatment of this vomiting. To obtain its action it is not necessary that it should reach the stomach ; for, if a tablet containing gr. $\frac{1}{6\,0}$ is placed on the tongue of a child of two to four years, it will readily be absorbed in the mouth and throat.

Mongolian Imbecility.—The word "imbecility," generally speaking, denotes a *symptom* which is characteristic of many morbid conditions. Its diagnosis in infancy is often very obscure, and its future course usually most difficult at that age to foresee. The term "Mongolian imbecility," on the other hand, is used as the name of a *disease*—a clinical entity as distinct and as definitely characterised as cretinism or congenital syphilis. This morbid condition presents such marked bodily features that it can be recognised at the very beginning of life ; and not only can the diagnosis be made with confidence then, but the prognosis also can be given in considerable detail.

It is well, therefore, that this most interesting subject is no longer being looked upon as belonging solely to the alienists, and is receiving attention on all sides from general physicians. One of the best articles on it which we have seen, from a practitioner's point of view, is by Dr G. A. Still, and appears in the new volume (vi.) of the "King's College Hospital Reports."

He begins by describing the physical characters of the disease as they are shown in the two excellent photographs which accompany the paper. Among other features, attention is drawn to the rounded, usually ruddy-cheeked face, with its small flat-bridged nose and epicanthic folds, and the obliquely placed eyes which have given rise to the name "Mongolian." The constant snuffling breathing is also referred to, the frequent protrusion of the broad tongue, the dwarfing of the general stature, and the sluggish circulation.

The development is backward in every respect. The teeth appear late, the fontanelle is late of closing, and walking and speaking are long of being acquired. In their mental condition these children are lower grade imbeciles rather than idiots. They are very slow to learn where reasoning is called for, but quick at mimicry, fond of music, amiable in disposition, and easily taught to be cleanly.

Very little light has been thrown on the condition as yet by study of its morbid anatomy. In one case examined by Dr Still the brain was distinctly too small, but otherwise looked and felt normal. The base of the skull was unduly short from before backwards, and it showed an abnormally small amount of synostosis for the child's age. Dr Still calls special attention to an

abnormality which was present here, and which he has several times found. It may be a constant feature in these cases, but it does not seem to have been previously placed on record. This consists in the vomer reaching so far backward as almost to touch the posterior wall of the pharynx, so that it forms a septum which can be felt by the finger in the naso-pharynx.

Of the causation of Mongolian imbecility almost nothing is known. It is not due to congenital syphilis, but it is certainly frequent in consumptive families. Dr Still agrees with Dr Shuttleworth's statement that "nearly one-half of these children are the last born of a long family, and he thinks that exhaustion of the mother's strength from any cause is, at present, the best established factor in the etiology.

The diagnosis should not be difficult to those who have once examined a well-marked case, but by others it is very apt to be mistaken for cretinism, and even for congenital syphilis, because of the flat nose and snuffling breathing.

The prognosis as to life is not good, as a very large proportion of the cases die in infancy. Bronchitis and broncho-pneumonia are common among them, and phthisis also is a frequent cause of death. Congenital heart disease is not rarely met with. The prognosis as to the mental condition is one of steady improvement up to a certain point. Although the child will remain capable of very little learning he will almost certainly be able to walk and to talk a certain amount at anyrate, and he will be able to feed himself and to keep himself clean.

No medicinal treatment is of any real value, and Dr Still, like most other observers, has found that thyroid is only useful to reduce excessive fat. These children will, however, be improved in many ways, besides being rendered much happier, by careful and suitable training and education.

New Books and New Editions

Experimental Study of Children. By ARTHUR MACDONALD, United States Bureau of Education. Washington: Government Printing Office.

THE Child-Study Movement was born in the Old World and is developing a very vigorous youth in the New, where an enormous amount of work in anthropology, in psychology, in philo-

sophy, in ethics, has been concentrated about the study of children.

Mr Arthur Macdonald's work on "Experimental Study of Children" consists of two chapters reprinted from the Report of the Commissioner of Education (United States) for 1897-98, and issued in the form of an unbound volume of some 325 pages. The book is essentially a work of reference, and cannot be described as readable, consisting as it does to a very large extent of series of tables, bibliographies, and extremely condensed summaries of important papers. This being the case it will probably be useful to mention briefly the kind of information for which the volume may be consulted.

The greater part of the first chapter is devoted to anthropometrical and psycho-physical measurements of over 1000 Washington school children. In a short introduction, the author pleads for systematic measurement of the physical development of all children, as being just as necessary for their welfare as the periodical testing of their mental progress. He urges, moreover, that during periods of rapid growth there should be some relaxation of the amount of study required. The method of carrying out the measurements is described, and some account is given of the Bertillon system, which was devised primarily for the identification of criminals.

The principal measurements given in the tables of the Washington children are of height, sitting height, arm reach, weight, and circumference of head. Tables are given showing the average measurements in these particulars for the different years of school life (chiefly from 6 or 7 to 15 years). Comparative tables illustrate the differences between dull and bright children, American and foreign children, white and coloured children. Several tables relate to children with abnormalities. These are classified under the headings: sickly; nervous; defective in eyesight, in hearing, in speech; convulsions; lazy; unruly.

In addition to Mr Macdonald's own measurements of Washington children, similar data were obtained by teachers in different schools, under the author's directions. These refer to 16,473 white children and 5457 coloured children. The figures obtained in this way were added and averages made, and summaries of these constitute many of the tables given in the book.

For purposes of comparison Dr Bowditch's measurements of 24,626 Boston children, and the results obtained by many European observers, are quoted.

Some points of interest to medical men are referred to incidentally. It is shown, for example, that for some time

before and after puberty girls are both taller and heavier than boys, but at no other time. Hence it is suggested that during this period of rapid growth, a period when the tendency to anæmia becomes marked, girls should have a large amount of open-air exercise and abundant sleep, and that both school-work and house-work should be diminished.

The chapter concludes with a short description of the psycho-physical and anthropometrical instruments of precision in the laboratory of the Bureau of Education, and a list is given of the apparatus contained in the Psychological Laboratory of Harvard University. Illustrations are given of many of the ingenious instruments in use, including not only the familiar sphygmograph, but the digitalgraph, the automatograph, the psychograph, the labiograph, the palatograph, the glosso-dynamometer, and many more.

The second chapter deals with Child Study in the United States, and summaries are given of a number of more or less important papers. The author's predilection for figures is again shown by his selection "rather of those reports which give data or tables of facts upon which the conclusions were based." Among the papers summarised are Dr G. Stanley Hall's well-known investigations into the "Contents of Children's Minds on Entering School," and his classic "Study of Fears."

The book concludes with a "Bibliography of Child Study," which extends to over thirty pages.

Altogether the book is one which will be useful to those who are undertaking investigations on the lines indicated, and its value as a book of reference is enhanced by a good index of subjects and authorities. "ACCIPITER."

The Mental Affections of Children: Idiocy, Imbecility and Insanity. By WILLIAM W. IRELAND, M.D. Second Edition. Pp. 450, illustrated. London: J. & A. Churchill. Price 14s.

THE second edition of Dr Ireland's book on "The Mental Affections of Children" may be regarded as a third edition of his work on "Idiocy and Imbecility," the more comprehensive title having been given to the book when published two years ago. The present edition has been brought up to date, and several illustrations have been added. There are now twenty-one excellent plates, chiefly from photographs, besides several illustrations in the text.

A work which is already so well known, and which has so quickly and deservedly attained a reputation, requires no ex-

tended notice here. Apart from the fact that it is an invaluable work of reference for medical men on the subjects of which it treats, it is an exceedingly interesting book to read. This is due not only to Dr Ireland's admirably lucid style and to the fulness of knowledge and experience out of which he writes, but to the aptness of his illustrations, and the number and variety of his references to other fields of thought, as well as to the freshness and suggestiveness of many of his remarks.

A special feature of the book is the attention paid to treatment. In this, Dr Ireland has kept in view the requirements of those who have the care and guardianship of idiots and imbeciles. Hence, in addition to the observations on medical treatment which are given in the chapters devoted to the different forms of idiocy, there is a long chapter on the best methods of educating idiots and imbeciles, and another on the laws relating to idiocy. In the latter, the author strongly advocates the prohibition of the detention of idiots or imbecile children, who are not also insane, in lunatic asylums; and urges the extension of the Idiots Act to Scotland, so that there should be no difficulty in the erection of training schools for all classes.

The etiology of idiocy is very fully discussed, and the conclusion is reached that "hereditary predisposition is, in most cases, insufficient alone to become the cause of idiocy, but requires to be reinforced by other unfavourable influences." The atavistic hypothesis, first advanced, we believe, by Vogt, and much elaborated by later writers, is examined with some thoroughness, and rejected by the author, who shows that the brain of the idiot is a pathological, not a physiological, type, and cannot be explained as a simple reversion to a phylogenetic stage in the evolution of the brain. So far the author's arguments seem quite convincing, but it is only right to add that Dr Ireland's scepticism as to the hypotheses of the Darwinians seems in places to carry him further than some of his readers will be able to follow.

An excellent account of the development of the brain includes a summary of the recent important work of Flechsig. The latter is of such interest, from its bearing on genetic psychology, that we wish Dr Ireland had been able to afford it a little more space. Although the summary is admirably clear, the significance of some of Flechsig's observations is not rendered very apparent. For example, we are told that the motor fibres from the lower portion of the third frontal convolutions are later in their development than those from the median convolutions; but in the absence of any express reference, one readily passes over the fact that one has here, apparently, an excellent example of the late development of fibres concerned

in specialised movements (those of speech), as compared with those associated with movements of a more generalised nature.

The observations of Vulpins on the development of the tangential fibres are quoted, and it is stated, on his authority, that "in the child of eight, or even perhaps of seven years, the fibres of the cortex and medullary substances are complete in number and calibre, and have taken the same arrangement as in the adults." No reference is made to the work of Kaes who, following Vulpins, has shown that tangential fibres continue to develop as late as the thirty-ninth year. Now Kaes' observations have a very important bearing on Flechsig's interesting theory, that the two-thirds of the cortex not composed of sensory and motor centres constitute a "highest level" series of association centres—"think-organs," as Dr Ireland literally translates—which are concerned with the higher functions of the mind. If Flechsig is right one would expect to find tangential fibres developing actively after puberty, when the reasoning powers are maturing; and this, according to Kaes, is what one actually does find.

The principal forms of idiocy have special chapters devoted to them. The general arrangement is in accordance with the classification introduced by the author in 1872, which is based upon pathological conditions. On account of misapprehensions, the term "genetous idiocy" has been substituted for "congenital idiocy," for those cases which, "shrouded in the obscurity of intra-uterine life, cannot be traced back to any known specific disease." The chapter on "Cretinism" will be read with special interest, and some very suggestive observations will be found in the chapter on the "Sensory and Mental Deficiencies of Idiots."

Copious references to the literature of the subjects treated of are given in the form of footnotes. Occasionally, however, the date of important papers has been omitted (*e.g.* in the case of Vulpin's above mentioned), and occasionally authors are quoted without express mention of their publications. Such omissions, however, are rare, and are only mentioned because the writer's remarks so frequently whet the appetite for fuller information.

Altogether the work is to be strongly recommended as most interesting and instructive to medical men, psychologists, and any others who are attracted by the subject, and Dr Ireland is to be congratulated on the success which it has already attained. One can say no more than that the book is worthy of the great reputation of its author. "ACCIPITER."

The Essentials of Regional Anatomy. By RICHARD J. A. BERRY, M.D., F.R.S.E., F.R.C.S.Ed. Lecturer on Anatomy in the New School, School of Medicine of the Royal Colleges, Edinburgh, etc. 8vo, pp. 484. Edinburgh and London: Wm. Green and Sons. 1900. Price 10s. net.

THE preface of this work at once arrests attention, as much by the eccentricities of its English, as by its highly contentious tone. The work, we are told, "is the outcome of the extremely unsatisfactory condition of the medical curriculum, as at present arranged." The author complains of the unwelcome increase in the number of lectures and classes which the student is required to attend under the five years' system, and that he "is further compelled to study physics, biology, chemistry and physiology, especially the last named, as though these subjects were to be his life's work—as though he was to be a specialist in science, instead of a practitioner of medicine. So much valuable time is now devoted to, and wasted over, these preliminary and largely unnecessary sciences, that the student of medicine cannot possibly master either the details of his life's work of the future or its practical foundation—Anatomy."

We do not hold a brief for any of these sciences against which the author launches his tirade, but this is surely the first time that it has been seriously stated that chemistry and physiology are "largely unnecessary sciences" for the student of medicine. Without in the least degree yielding to the author in his appreciation of the importance of anatomy, we venture to think that even if the student knows all that is packed into the 480 odd pages of this book (and he could do with a good deal less), he will make but a sorry practitioner if, at the same time, he is led to believe in the uselessness of a knowledge of physiology.

Dr Berry goes on to express the hope that the study of his pages will render the practitioner of the future "less liable to the contemptuous remark, that he is pouring drugs of which he knows little into a body of which he knows less." Is it not just possible that the efficiency, or inefficiency, of these same drugs may depend as much upon the practitioner's knowledge of the functions of the organs into which they are poured, or towards which they are directed, as upon his recollection of the anatomical relations of the viscera to one another, or of the names of the blood-vessels and nerves which supply them?

And again he says: "compulsory hours are devoted to practical physiology, and several other practical sciences, but the study of practical anatomy is left to fate and to the discretion of the students." If this be so, and we are prepared to accept

the author's statement, then we think that the blame that "a knowledge of human anatomy by the practitioner of medicine is rapidly becoming a lost art" (*sic*) lies at the door of the teachers of anatomy, and can not be transferred to those who make a *practical* study of their subjects compulsory.

Nor are we convinced that the issue of this work will improve matters. On the contrary, we fancy we find the weak link in the author's chain of argument in the penultimate paragraph of his preface. "It has not been thought desirable, as yet," he says, "to introduce any illustrations. To compensate for this the work is interleaved, for the student to introduce for himself sketches of his dissections, or the reproduction of diagrams from the black-board. It is to be feared that the over-crowded state of the medical curriculum will reduce him to the latter alternative." Is not this a direct encouragement to the student to learn his anatomy from books and black-boards rather than from the dead body?

As regards the subject matter of the work it is entirely satisfactory. The facts are clearly, succinctly and accurately stated. The arrangement is logical and practical. The absence of illustrations is a serious defect, and much will depend upon whether the student fills in the blank pages with sketches of his own dissections, or with diagrams copied from the black-board.

"SCOT."

Imperative Surgery for the General Practitioner, the Specialist, and the Recent Graduate. By HOWARD LILIENTHAL, M.D., Attending Surgeon to Mount Sinai Hospital, New York City. 4to, pp. 412, with 153 illustrations. New York: The Macmillan Company. Price 17s. net.

IF we consider this book as it stands, without reference to its title or its objects, it is almost impossible to speak too highly of it. The text is clearly written, the descriptions of operations are concise, accurate and practical, and, on the whole, the author has selected the best operative methods for description. The illustrations, which are all original, are from photographs or drawings made during the progress of actual work in the author's practice, and in point of artistic excellence and educational value are as nearly perfect as such things can be.

The large, clear type, the wide margins, the thick paper—albeit it is glazed, doubtless for the sake of the plates—and the tasteful, yet business-like binding, go to make up one of the most handsome works on surgery we have had the good fortune to meet.

It is when we come to consider the work in relation to its purpose that we meet with difficulties. The preface tells us that "the practitioner of general medicine who rarely takes up the scalpel, the specialist whose path seldom leads him to the operating-room, and the recent graduate who, though versed in the lore of the books and lectures, has seen but little surgery at close range, are those for whom this work has been prepared." The general practitioner and the recent graduate we understand, but the specialist puzzles us. Clearly it is not the surgical specialist who is addressed, because his path invariably leads him to the operating-room—sooner or later. Are we to understand that the dermatologist, the ophthalmologist, the neurologist, or some other of the thousand and one "specialists" are on occasion to undertake the operations described in this work? In the interests of the patients we venture to think it would be better that they should join the author's "practitioner of general medicine," and leave the scalpel alone. There are undoubtedly many operations which every practitioner, be he general, special or recent, should be prepared to undertake on emergency, but "cholecystotomy in the presence of adhesions," gastrostomy, and resection of intestine, are not among them. If, on the other hand, he requires to refresh his memory before performing tracheotomy, colostomy, or relieving a strangulated hernia, he could wish for no better guide than the work under review furnishes.

Nor is the author quite consistent in carrying out his scheme. The work "presupposes the absence of a surgeon, and the impossibility or inexpediency of removing the patient or of waiting for expert assistance," yet we are told, for example, on page 239, where the operation for appendicitis is described, that "at least two assistants will be required in addition to the anæsthetist, and as these two may be needed at the wound, a nurse or two will not be found superfluous." Surely the time required to mobilise this staff of assistants would be sufficient to obtain the services of an expert surgeon.

The author gives an excellent illustration, which is worth pages of written description, of how a bedroom can be adapted to the purposes of an operating room. He has, however, selected a large, well-lighted, and well-appointed room for the purpose. Unfortunately when the general practitioner finds himself compelled to take up the scalpel to save a life, it is usually in a small, stuffy, candle-lit cottage, where the necessary appliances are as difficult to obtain as the expert assistance.

In making these remarks we in no way desire to detract from the inherent merits of the work before us, but we cannot rid ourselves of the idea that the author has somehow missed his mark.

The attempt to combine perfection of antiseptic and aseptic technique with the exigencies of emergency surgery in private practice and under unfavourable circumstances, has not been entirely successful.

Vasectomy relative to Prostatic Disorders and Catheter Life, and Report to the 13th International Congress of Medicine (Paris 1900) on Urethro-stenosis. By REGINALD HARRISON, F.R.C.S. London: J. & A. Churchill. 1900. Price 3s. 6d.

THIS small work consists of reprints of three papers by the author from *The Lancet*, together with his report to the International Congress of Medicine (1900) on the remote effects of structural lesions employed in the treatment of stricture of the urethra. Mr Harrison's views upon the part played by the prostate in relation to micturition are well known. In enlargement of the prostate he recognises three varieties.

First.—That from blood engorgement, the main mass being of the nature of an erectile structure.

Second.—A fibrotic mass of degenerated connective tissue and muscular fibre.

Third.—More or less isolated prostatic tissue resembling an adenoma.

He mentions the various operative procedures in vogue in the treatment of prostatic enlargement, and points out that vasectomy, the use of which he advocates in place of castration, is mainly valuable in the first variety of these prostatic enlargements. He believes vasectomy to be successful in diminishing vesical irritability whether associated with catheter life or not. Further he states that sacculation, pouching or trabeculation of the bladder frequently cause permanent damage to voluntary expulsion of urine. It is not easy to see why a sacculation should cause such difficulty, and the cases quoted seem inadequate to prove the author's thesis. The view enunciated in this connection on page 26 is very questionable.

Throughout the work the influence of sepsis as an important factor in prostatic conditions is too much ignored, and too great stress placed on the simple mechanical difficulties as influenced by vasectomy. The statement that double vasectomy causes no untoward results is no doubt true, but it is not proved that double castration *per se* is the cause of the serious results which have been observed in some cases to follow the operation. Either operation, in old persons, no doubt causes some change

in the prostatic, more particularly in the diminution of vascular engorgement, and this may be of the utmost value in future catheterisation; but just as some authors have claimed too much success for castration, so we think Mr Harrison claims too much for vasectomy.

The report contained in the second part of the book tells nothing new, and the criticism may be made that the term "deep urethra" is too loosely used. We are glad to observe, however, that the author emphasises the need for the passage of bougies during the patient's life after any method of treatment.

Essentials of Practical Bacteriology. H. J. CURTIS, B.S., M.D. 8vo, pp. 200, illustrations. London: Longmans, Green & Co. Price 9s.

THERE are already a number of similar works, but after a careful perusal we are satisfied that this one will find many friends. It is not too big, the type is clear, and the illustrations are numerous and informing. Methods are briefly but accurately described, and figures of apparatus are given when required. The description of each organism and its method of growth is just what is wanted in a laboratory book, while the information given regarding the more common ones is enough for the wants of the ordinary worker. The only omission we have noted is that of Ducrey's "Bacillus of Soft Sore," surely of sufficient importance to merit reference.

Two departments call for special remark; the section on the pathogenic moulds is—well, it is not to be compared with the antiquated histories usually related. The descriptions of Ringworm and Favus are quite up to date and are beautifully illustrated. We might criticise the prominence given to some and the entire ignoring of other British workers. Thus a full description is given of Adamson's method of staining the fungi of the hair, while there is not even a reference to Morris', which in our experience is superior; while Leslie Roberts, the pioneer of British work on the subject, is not even mentioned. Still the section is unapproached by any similar work.

The section on cancer parasites contains a succinct account of Mr Plimmer's recent work, but here again there are notable omissions in the references. All the British observers referred to live or lived in London.

These, however, are mere details, and we confidently state our opinion that the book need not fear comparison with any similar work on the market.

Letter, Word and Mind Blindness. By JAMES HINSHELWOOD, M.A., M.D. Pp. 88, Cr. 8vo. London: H. K. Lewis. Price 3s.

DR HINSHELWOOD has published in book form the papers which he read before the Glasgow Medico-Chirurgical Society, and which appeared in the *Lancet*. These papers at the time brought before the profession in this country the valuable work which had been done on the Continent by clinical observers, of whom Déjerine and his pupils are the chief. Besides, however, giving in an accurate and accessible form the results of the observations of others, this work contains very valuable clinical observations by the author. His cases, which are very accurately recorded, are excellent illustrations of the great variety of symptoms exhibited by patients suffering from visual aphasia.

It is unfortunate, from a pathological point of view, that want of a *post-mortem* examination did not enable him to verify the accuracy of the views of the French school. Such verification has, however, come from many sources, although one could have wished that so well-defined cases as those of Dr Hinshelwood could have been shown to have been confirmatory.

Hinshelwood strongly advocates the view that the visual memories of words and letters are stored separately in the brain. He says: "Clinical evidence demonstrated the complete independence of the visual memories of letters and of words, and that this complete functional independence could only be reasonably explained on the assumption that these distinct groups of visual memories are stored and preserved in different but probably contiguous areas of the cerebral cortex." This view is probably the one most generally accepted by clinical observers, but it still lacks pathological confirmation.

To those interested in these varieties of aphasia the book will be found a useful summary of our knowledge up to date of the subjects of which it treats.

A Manual of Midwifery. By ALFRED LEWIS GALABIN, M.A., M.D. (Cantab), F.R.C.P. (Lond.), Obstetric Physician and Lecturer on Midwifery and Diseases of Women to Guy's Hospital. Pp. 870, 298 engravings. Fifth Edition. London: J. & A. Churchill. Price 15s.

IT is scarcely necessary to say much in reviewing a new edition of a work which, since its publication nearly fifteen years ago,

has held a foremost place in the obstetrical literature of this country. The book before us, although still claiming to come under the category of a manual, contains as much information as that given in more bulky treatises.

Dr Galabin has brought the present edition down to date, as shown by the extended chapters on Extra-uterine Gestation, Puerperal Fever, and Symphysiotomy.

Many new figures are introduced. We would specially note those illustrating Hegar's Sign of Pregnancy, Leopold's work on the Early Ovum, and micro-photographs of Deciduoma Malignum.

The author still considers that the vectis has fallen into unmerited disuse, and he recommends it to aid rotation in occipito-posterior positions. Under the chapter on Hæmorrhage in Pregnancy, plugging the vagina in accidental hæmorrhage, as introduced at the Rotunda Hospital with favourable results, is fully described. The chapter referring to the artificial feeding of infants will be found specially instructive and interesting.

Printers' errors are few. On page 444 "Balfour's frozen sections" is probably intended for Barbour's work on the subject.

Taking the volume as a whole, the author is to be congratulated on the publication of a work which can be confidently recommended to practitioner and student alike, and which, we are sure, will continue to be regarded as a standard obstetrical text-book.

Minor Surgery and Bandaging, including the Treatment of Fractures, &c. By HENRY R. WHARTON, M.D. Fourth Edition, revised and enlarged, with 502 illustrations. London: Rebman Ltd. 1899.

THIS, the fourth edition, has been considerably enlarged, several new articles and illustrations having been introduced.

Part I. is devoted to bandaging, and gives a fairly complete description of the subject, the illustrations are numerous and on the whole good, though the outlines of the bandages are in several instances indistinct.

Minor Surgery is dealt with in Part II., which contains much information which will be useful to the student, regarding the various agents and materials used in surgical practice and the methods of employing them.

Part III. and IV. contain a description of fractures and dislocations which is suitable to the needs of the student, and well illustrated.

The remaining 150 pages of the volume are devoted to the consideration of operative surgery, by far the greater part relating to operations which belong to major surgery. Amongst other operations which are rarely called for, we find described that of "excision of the sternum." The instructions for the guidance of the student are for the most part too short and indefinite to prove of any real value even for operating on the cadaver.

One is misled at the outset by the title of the book, and we think it a matter for regret that the writer has not restricted himself to the subjects which are really included in the title of "Minor Surgery."

Golden Rules of Skin Practice. By D. WALSH, M.D. Waistcoat Pocket Size. Pp. 102. Bristol: J. Wright & Co. Price 1s.

A PERUSAL of this waistcoat pocket work has convinced us that Dermatology at least does not lend itself to this method of treatment. The book consists of short sentences of advice, commencing "Never," "Remember," "Bear in mind," "Always," etc., and with most of them we cordially agree. But we do not understand for whom the book is intended. So much is taken for granted, that it is evident that the reader is expected to know the subject already, and if it is intended that the book be constantly carried, the owner will require to wear a sort of bandolier, for we note that this is No. 8 of a series.

There are two well-stated facts in the three pages on Internal Treatment: (1) "The best dermatologist is the best physician"; and (6) "The less a medical man knows about skin disease the more apt is he to use arsenic."

Our sympathies are with the author. The Israelites of old had to make bricks without straw, and we have seen medical works similarly composed; Dr Walsh's supplies of clay and straw are evidently ample, but the mould is too small.

The Cause and Prevention of Decay in Teeth. By J. SIM WALLACE, M.D., B.Sc., L.D.S.Eng. 8vo. London: J. & A. Churchill.

FOUNDING upon the assumption that Dental Caries is invariably initiated by the acid formed in the operations of micro-organisms upon the carbo-hydrates, Dr Wallace considers certain kinds of food lodging between the teeth as mainly productive of such chemico-parasitic action.

The observations and experiments adduced in support of this view are of considerable interest. The predisposing conditions and detrimental circumstances regarded by him as factors in the increasing prevalence of Caries and other dental diseases, are discussed at some length; while the general bias of the author is well shown in one of his closing remarks, when in reference to preventative in comparison to curative measures, he states, that so long as the attention of dentists is absorbed in the art of filling and making teeth—even so long will Dental Surgery be merely an empirical calling, and dental decay and its consequences go on apace.

Arzneiverordnungen in der Kinderpraxis. Von Dr med. H. Guttmann. Dritte, vollständig umgearbeitete Auflage. Berlin: Verlag von S. Karger, Karlstrasse 15. 1901.

THIS neat little interleaved volume presents an alphabetically arranged list of the drugs most commonly used in Germany in practice among children. It describes their physical and pharmacological characters, and indicates their therapeutic uses and their doses. The price of each drug is given—a practical point which might possibly be imitated with advantage in some English works on treatment. In many instances prescriptions are added, as well as practical remarks about the incompatibilities and contra-indications of various drugs.

The usefulness of the book is shown by the fact that this is the third edition to appear within a few years, and that it has already been translated into Italian and Russian.

List of Books Received

From S. Karger, Berlin.

KURZGEFASSTES LEHRBUCH DER KINDERHEILKUNDE für Aertze und Studirende. By Dr Carl Seitz. Second Edition. Price 10 marks 80.

ANLEITUNG ZUR DIAGNOSE UND THERAPIE DER KEHLKOPF — NASEN — UNDOHRENKRANKHEITEN. By Dr Richard Kayser. Price 4 marks.

ARZENEIVERORDUNNGEN IN DER KINDERPRAXIS fur Studirende und Aerzte. By Dr med. H. Guttmann. Third Edition. Price 2 marks 80.

From Longmans, Green & Co., London.

MALARIA. By Professor Angelo Celli. Translated from the Second Italian Edition by John Joseph Eyre, M.R.C.P., etc. Price 10s. 6d.

NOTES ON PHYSIOLOGY. By Henry Ashby, M.D. Lond.. F.R.C.P. Seventh Edition. Price 5s.

THE PRESENT POSITION OF THE TREATMENT OF SIMPLE FRACTURES OF THE LIMBS. By William H. Bennett, F.R.C.S. Reprinted after revision from the *British Medical Journal*. Price 2s. 6d.

ESSENTIALS OF PRACTICAL BACTERIOLOGY. By H. J. Curtis, B.S., M.D. Price 9s.

ON THE USE OF MASSAGE AND EARLY PASSIVE MOVEMENTS IN RECENT FRACTURES, etc. By William H. Bennett, F.R.C.S. Reprinted after revision from the *Lancet*. Price 4s. 6d.

DISEASES OF THE ANUS AND RECTUM. By D. H. Goodsall, F.R.C.S. Eng., and W. Ernest Miles, F.R.C.S. Eng. Part i. Price 7s. 6d.

From Oliver & Boyd, Edinburgh.

ANGIOMA AND OTHER PAPERS. By the late John Duncan, M.A., LL.D. Edited by James Hodsdon, F.R.C.S.Ed., with memoir by Professor Chiene. With portrait. Price 5s.

From William Green & Sons, Edinburgh and London.

ESSENTIALS OF REGIONAL ANATOMY. By R. J. A. Berry, M.D., F.R.S., F.R.C.S.Edin. Interleaved. Price 10s.

From the U.S. Government Printing Office, Washington.

NUTRITION INVESTIGATIONS AT THE CALIFORNIA AGRICULTURAL EXPERIMENT STATION. 1896-1898. By M. E. Jaffa, M.S. Bulletin No. 84.

From Baillière, Tindall & Cox, London.

A MANUAL OF PHYSIOLOGY with Practical Exercises. By G. N. Stewart, M.A., D.Sc., M.D. Edin., D.P.H. Camb. Fourth Edition. Price 15s.

A MANUAL OF SURGERY. By William Rose, M.B., B.S. Lond., F.R.C.S., and Albert Carless, M.S. Lond., F.R.C.S. Third Edition. Price 21s.

UTERINE TUMOURS, their Pathology and Treatment. By W. Roger Williams, F.R.C.S. Price 10s. 6d.

ARSENICAL POISONING IN BEER DRINKING. By T. N. Kelynack and William Kirkby. Price 3s. 6d.

From J. & A. Churchill, London.

LECTURES ON MEDICAL JURISPRUDENCE AND TOXICOLOGY. By Fred. J. Smith, M.A., M.D. Oxon., F.R.C.P. Lond., F.R.C.S. Eng. Price 7s. 6d.

VASECTOMY RELATIVE TO PROSTATIC DISORDERS AND CATHETER LIFE. By Reginald Harrison, F.R.C.S. Eng. Price 3s. 6d.

HOW TO EXAMINE THE CHEST. By Samuel West, M.D. Oxon., F.R.C.P. Third Edition. Price 5s.

From G. Masson, Paris.

LES MALADIES QU'ON SOIGNE À BERCK. By F. Calot.

From J. Wright & Co., Bristol.

GOLDEN RULES OF SKIN PRACTICE. By D. Walsh, M.D. Price 1s.

From William F. Clay, Edinburgh.

A TEXT-BOOK OF PATHOLOGY IN RELATION TO MENTAL DISEASES. By W. Ford Robertson, M.D. Price 21s.

From Rebman, Ltd., London.

PRACTICAL GYNÆCOLOGY. By E. E. Montgomery, M.D. Price 25s.

From Macmillan & Co., Ltd., London.

A MANUAL OF MEDICINE. Edited by W. H. Allchin, M.D. Lond., F.R.C.P., F.R.S.Ed. Vol. ii. Price 7s. 6d.

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THE SCOTTISH
MEDICAL AND SURGICAL
JOURNAL

THE EDINBURGH HOSPITAL IN SOUTH AFRICA, AND ITS WORK[1]

By FRANCIS D. BOYD, M.D., F.R.C.P.Ed.,
Physician to the Edinburgh Hospital in South Africa, Assistant Physician to the Royal Infirmary, Edinburgh, etc.,
and
GEORGE L. CHIENE, M.B., F.R.C.S.Ed.,
Assistant Surgeon to the Edinburgh Hospital in South Africa

THE account of the Edinburgh Hospital was opened with a lantern demonstration by Dr Boyd of views of the hospital from the earliest days at Norval's Pont to the time of completion. The building of the hospital, its working, sanitation, water supply, and other points, were in turn dealt with. Dr James Miller next gave an account of the 57 cases dealt with in the X-Ray department. Dr Chiene gave an account of the surgical work of the hospital, and thereafter Dr Boyd read his paper on the medical work of the hospital.

The Surgical Work of the Hospital

By DR GEORGE L. CHIENE

MR PRESIDENT AND GENTLEMEN,—Dr Boyd, with the permission of the Society, has asked me to show some lantern slides demonstrating the various forms of bullet wounds treated in the Edinburgh and East of Scotland South African Hospital, and to say a word or two about the surgical part of the work of the hospital.

[1] Communicated to the Medico-Chirurgical Society, Edinburgh.

I am very sorry that Mr Wallace, owing to his unfortunate illness, was unable to superintend the surgical work. Dr Watt was to have taken his place to-night, but he has within the last week gone back to South Africa.

To Dr James Miller we are indebted for the X-ray photographs and for the notes regarding them.

The total number of surgical cases treated was 166 (this does not include out-patients, a great number of which were surgical).

The surgical cases treated in the hospital, with the exception of a few, were all admitted on or after July 26th, the chief work of the hospital up to that time being of a medical nature.

Of the above cases 75 were bullet or shell wounds—65 due to bullet, 10 due to shell wounds.

The great majority of the above were wounds of the extremities, as is seen from the following table:—

Head and neck	8
Thorax	10
Abdomen	8
Extremities	49

The other cases, which we may combine under the head of general surgery, included injuries, burns, fractures, abdominal cases; tubercular, urinary and specific disease.

We had three deaths, one a compound fracture of the base of the skull and compound fracture of both legs. Two were moribund abdominal cases, one of which was a perforation due to typhoid.

The cases of general surgery are of no special interest to us at present, except from the fact that a great number of them were directly due to the campaign.

I will now show one or two photographs of cases of general surgery on the screen, and then some demonstrating the varieties of bullet wounds treated by us at Norval's Pont. Before doing so, however, I would draw attention to the bullets and pathological specimens on the table.

Photographs of the following cases were then shown:—

1. A marked case of varicose veins requiring operative interference.

2. A case of acute middle ear disease following typhoid fever, also operated on.

3. A case of gangrene of both feet following an attack of pneumonia. The one leg was amputated at the seat of election, and on the other foot a Syme's amputation was performed.

X-ray photographs, illustrating five cases of shrapnel wounds, followed. All, with the exception of one, were septic on admission.

The first case was one of a severe compound fracture of the radius, the photograph showing the splintering of the bone.

The photograph of the second case showed a compound fracture of the humerus with the shrapnel *in situ*. The septic cavity was opened up and the bullet removed.

The third showed a shrapnel bullet embedded in the outer condyle of the femur. The bullet was removed.

The fourth showed splinters of shrapnel in the region of the wrist joint.

The only aseptic case, of those shown, was the last: a shrapnel bullet lying in the upper part of the adductor longus. The bullet was removed, and the wound healed in a week.

X-ray photographs illustrating five cases of bullet wounds were then shown: four due to Mauser bullets and one caused by a Lee-Metford. All were aseptic on admission except the first, which was a severe compound fracture of the metacarpal bones of the hand requiring operation.

The second showed a bullet in the region of the spine on a level with the iliac crest. The case was operated on, but the bullet was not found. The wound healed without trouble.

The third case was one in which the bullet was embedded in the head of the tibia. The knee joint was opened and the bullet removed. It was found to be a Lee-Metford. The patient recovered with a stiff knee.

The fourth case was one of special interest. The bullet was seen lying in the head of the left fibula, having first passed through the right thigh. Some fragments of the bullet could be seen lying in the region of the popliteal artery of the left leg. The bullet was removed from the head of the fibula, no attempt being made to remove the fragments. A short time afterwards a popliteal aneurism developed. It was found

necessary, at a later date, to ligature the femoral artery at the apex of Scarpa's triangle.

The photograph of the fifth case showed a bullet lying on the anterior surface of the femur. The bullet was removed through an incision on the outer aspect of the thigh.

Several photographs were then shown of a soldier whose lower jaw had been carried away by a pom-pom. The operation was done in three stages. The patient was then shown along with his photograph which was taken previous to his departure for South Africa.

The Medical Work of the Hospital

By DR BOYD

DURING our time at Norval's Pont, we admitted between five and six hundred patients and prescribed for eighteen hundred out-patients. Of the medical cases, the principal disease dealt with was enteric fever. We admitted in all, a little over 150 cases of the disease. The onset of the disease was in almost every case identical—pain in the back of the head and in the neck and limbs. The bowels were, as a rule, constipated, diarrhœa was the exception.

The marked characteristic was the extreme foulness of the mouth accompanied by inflammation of the fauces. In many of the cases this might be ascribed to unavoidable neglect, but it was present even in the cases amongst the staff when the greatest precautions were taken from the outset of the disease. Ulceration of the soft palate, the so-called pharyngo typhoid, was only seen once. Melæna occurred in only two cases; in one it was slight, in one it proved fatal in a few hours.

Considering the frequency of dust storms, it is rather surprising to find how few of the cases exhibited affections of the upper respiratory tract. In one there was laryngitis with aphonia. In one instance of the gloom which necessitated tracheotomy. The patient, much to our disappointment, died nineteen days after operation, from asthenia and bronchitis, the tube having been removed two weeks before death.

Pneumonic consolidation of the lungs was met in 15 per

cent. of the cases. No case of true crupous pneumonia occurred as a complication, though broncho-pneumonia was fairly frequent. Infarction of the lung with hæmoptysis was seen in two cases. Pleurisy with effusion in four cases. Hiccough, a somewhat rare complication, except in connection with diaphragmatic peritonitis, was in one case a very serious feature. The patient hiccoughed for nine days; for three days the hiccough was continuous night and day, entirely preventing sleep, and gave rise to grave anxiety. There was no peritonitis, and the patient made a good recovery. In three cases old standing cardiac lesion was discovered on admission. Of these three cases two died, demonstrating what a serious handicap an old-standing cardiac lesion is in enteric.

Thrombosis was present as a common complication, occurring in 6 per cent. of the cases. It came on late in the disease, occurring in the earliest case on the *twenty-sixth* day. There was, as a rule, a rise of temperature, with pain along the course of the veins, usually the veins of the leg, and œdema of the limb. In one case thrombosis of the branches of the middle cerebral artery gave rise to paralysis with aphasia. One is at a loss to account for the frequency of thrombosis as a complication. It is rare in America, though frequent enough in Great Britain. It has been ascribed to putties, but our cases had been, in the earliest case, twenty-six days without putties being worn, and putties should, if properly applied, have a supporting, not an injurious influence on the veins. Nephritis and cystitis were met but rarely, and they only occurred in patients who started with a damaged urinary tract.

Relapse occurred in 5·3 per cent. of the cases, a low proportion when dealing with male patients alone. There was no mortality from relapse. Chiari has suggested that the cause of relapse is a storing up of bacilli in the bile ducts. On any error in feeding, extra strain being thrown on the liver, the bacilli are discharged into the alimentary canal and a fresh infection takes place. Our experience does not agree with this. There was no error in feeding in most of the cases, and in addition in the fatal cases, as can be seen from Dr Miller's specimens, no bacilli were found in the liver or bile ducts. There is, however, marked reactionary changes and stasis in the mesen-

teric glands. It seems more probable that reinfection takes place from the mesenteric glands on subsidence of the reaction in the glands, the poison being set free as the lymph stream is re-established.

The fever, as seen in South Africa, may be divided into three types: the mild or abortive, the grave, and the apyrexial. Of the mild type a number of cases were seen. The patient had headache, malaise and gastro-intestinal disturbance, with a mild fever lasting six to eight or ten days. Of the grave type there were two distinct classes. In the one the gastro-intestinal symptoms predominated. There was a very foul tongue, the abdomen was markedly distended, nourishment was poorly taken and badly assimilated. If the nourishment was pushed, the stools showed the presence of undigested milk. If the case proved fatal, very extensive ulceration of the small intestine was found. In the second variety, which might be described as the toxæmic, the rash was marked, the temperature high, and the nervous symptoms predominated, while the abdominal symptoms were subsidiary. Only one case of the apyrexial type of the disease was noted, in one of the members of the staff who had been inoculated. He had a rash, gastro-intestinal symptoms, enlarged spleen, and typical stools, but the temperature during the five weeks he was in hospital only once rose to 99·4; as a rule it was subnormal. The condition appeared to be a mild attack of enteric modified by inoculation.

Widal's reaction was carried out in all doubtful cases, and in most cases where the diagnosis was certain. The dilutory medium used was either bouillon or normal saline in a dilution of 1 in 30. There were always three to six observations going on, so a check was thus established. The culture used was 24 to 30 hours old.

An account was then given of nine cases of apparent enteric fever where the agglutinative test proved negative, and the diagnosis discussed.

"Simple Continued Fever."

In the new classification of disease "simple continued fever" is to be dealt with as a distinct entity. It is probable that

it owes its presence to the fact that the authorities desire a definite diagnosis for weekly returns, and it may at the time be impossible to say what febrile condition the patient is developing. After a few days the condition declares itself to be possible enteric fever. The diagnosis is not changed in the returns—it cannot be. The patient must be nominally discharged as simple continued fever, and readmitted as enteric fever. But is there such a disease as "simple continued fever"? Most army medical men who have had large experience in tropical and sub-tropical climates assure me that there is a definite febricula which occurs in white people in hot climates who have undergone fatigue and been exposed to the influence of a tropical sun. The civil surgeons, on the other hand, were for the most part inclined to regard all cases of "simple continued fever" as undiagnosed enteric fever.

It is interesting to consider the cases which were admitted to the Edinburgh Hospital, for we had the means, by examination of the blood, of more or less certainly excluding enteric fever.

In all, we admitted 38 cases. Of those 38, in ten no definite diagnosis could be arrived at. The patient was seedy and run down. There was no fever while in hospital. He had a history of headache, and possibly a day of doubtful fever. When under our care there were no physical signs of disease; the Widal's reaction was negative. It is possible, I think indeed probable, that those patients were for the most part convalescents after influenza. There was a considerable amount of influenza in South Africa at the time, and I am inclined to think that influenza will account for most, if not all, of the ten cases. Of the remaining 28, seven were undoubtedly cases of enteric fever of a mild or abortive character. There was the usual history of headache, malaise, constipation, and some fever lasting a few days. Examination of the blood gave a positive Widal's reaction. Four cases may have been abortive enteric fever. There was a similar history of malaise, fever for a few days, etc., and the examination of the blood was positive, but then the patient had been inoculated against enteric so no diagnostic evidence could be drawn from the Widal's reaction. In six cases there was a history of former repeated attacks of malaria fever. The patient when he came to us had as a rule

been dosed with quinine; thus in none of the cases were we able to prove the presence of the malaria parasite, but the fever must be considered to have been of malarial origin. Take a soldier who has had repeated attacks of malaria, expose him to the influence of a hot sun by day, cold by night, couple this with fatigue and possibly damp. Such a man being predisposed through his malaria to febrile reaction, I see no reason to doubt that under the circumstances a febrile attack will be precipitated. The same applies to Mediterranean fever. Two of the patients admitted had had repeated attacks of Mediterranean fever. When under our care they passed through a mild febricula which was certainly not enteric fever, but no more was it a definite attack of Mediterranean fever. Of the other cases of "simple continued fever," two were catarrhal dysentery; one, debility from overmarching, with some slight dilatation of the right side of the heart; convalescent pneumonia accounted for one; rheumatism for one; gastro-intestinal catarrh for one; one was a surgical case; one the results of salivation with mercury; and one an early pulmonary tuberculosis. From these facts one may conclude that "simple continued fever," while it is a useful term for a preliminary diagnosis, can scarcely be elevated into the position of a distinct disease. As a rule, if the case is watched with care, a definite diagnosis can be arrived at. The figures are of interest from another point of view: if 18 per cent. of the cases of "simple continued fever" are enteric fever, it is very desirable to have more definite diagnosis, or else sanitary precautions should be taken in all febrile conditions where enteric cannot be definitely excluded.

Anti-Typhoid Inoculation.

Since the occurrence of the disastrous epidemic of enteric fever in South Africa, medical men, and one might, with justice, say the public in general, have looked forward with great interest to an account of the effects of inoculation on the disease. Has inoculation proved as valuable as was hoped, not only in preventing, but in modifying the disease? I fear that it is impossible from the experience of a single hospital to give a satisfactory answer to such a question. We must

wait till the statistics of the whole campaign are published before we can draw any definite conclusion, and even then these statistics will require very careful consideration.

Inoculation is based upon the fact that when animals are inoculated with dead cultures of typhoid bacilli, an increased power of resistance against the invasion of the living typhoid bacillus is established. In man, it has been proved that the injection of an emulsion of dead typhoid bacilli produces the same blood changes that a similar injection produces in animals. It has further been shown that the same blood changes are produced in man by the injection of an emulsion of dead typhoid bacilli as are produced by an attack of enteric fever.

Of the staff of the Edinburgh Hospital 58 were inoculated; 27 being done once, and 31 twice. In 7 the inoculation appeared to produce no appreciable effect. In a smaller number there was merely a slight local reaction as indicated by some tenderness at the point of inoculation perceptible on the following day. In the very large majority of cases there was marked local and general reaction. The effects of this inoculation were manifest in from two to five hours. There was a feeling of malaise and faintness, with, as a rule, a rise of temperature of 2° to 4°. In some cases there was an actual rigor. At the point of inoculation there was marked pain and swelling. The feverish condition lasted, as a rule, for twenty-four to thirty-six hours, after which the local swelling diminished. In some cases there was marked enlargement of the lymphatic glands nearest to the point of inoculation which persisted in one case for weeks. In the cases where inoculation was performed twice, the second reaction was not so severe as the first.

Amongst the staff of the hospital, of the 58 inoculated, 9 developed enteric fever. Of those 9 cases one proved fatal, death supervening on the twenty-fifth day from a sudden attack of cardiac failure. It must in fairness be noted that the patient started his attack with an impaired heart from an old standing mitral lesion. Of the remaining 8 cases, 3 may be described as very severe attacks with persistent high fever, and marked abdominal or nervous symptoms. In 4 cases the attack was pronounced, in one it was of an apyrexial type.

Relapse occurred in one case, there were complications in two cases; in both, pleurisy with effusion; in one, thrombosis of the veins of the leg.

Inoculation was carried out twice in the fatal case and in four of the milder attacks; once in the three very severe cases and in the apyrexial case.

Of the soldiers admitted into hospital who had been inoculated, inoculation had been performed once in every case. Eighteen cases of enteric were observed. Two were very severe, five severe, and ten were apparently modified attacks. Though the signs and symptoms of enteric fever were present they were very mild, the fever not being high and often of short duration (seven to ten days). In two complications occurred, five cases were admitted with a history of a slight fever with gastro-intestinal disturbance. It is impossible to be certain if these were cases of enteric fever. They may have been modified attacks, but some of the signs and symptoms were absent; and as they had been inoculated, the presence of a positive Widal's reaction was valueless from a diagnostic point of view.

Our experience thus has been that while inoculation *appears* to modify the disease, as completely modified attacks are met with in the uninoculated. Again, very severe attacks with complications and relapse occur in those who have been inoculated. One cannot from this conclude that inoculation has been valueless, for had not the patient been inoculated the attack might have been still more severe.

It is interesting in this relation to consider the significance as regards immunity indicated by the presence of an agglutinative reaction in the blood. On this point there is much difference of opinion. Some observers hold that agglutination and immunity are distinct; others that agglutination is the essence of immunity. Experimentally it is found that a high degree of agglutinative power is never present without a certain degree of immunity. It is probable that the presence of agglutination indicates that reactive processes have occurred in the body which lead to increased resistance.

Our experience of the presence of agglutination after anti-typhoid inoculation was very varied. In some individuals the agglutinative power of the serum disappeared very rapidly, even in those who had been inoculated twice. In others who had

been inoculated twice under the similar conditions there was marked agglutinative power after six months : the agglutinative power was indeed so high that the reaction took place almost instantaneously. Were these persons immune against enteric infection? I do not think one can go the length of saying that they possessed complete immunity against natural conditions of infection, but I think we can say that a reaction had taken place which led to an increased power of resistance.

It is exceedingly important to note that in the case of three of the staff who developed enteric fever, agglutinative power was *absent* during the early days of the fever, therefore we can with justice conclude that it was not present at the time of infection.

The effect of inoculation on the mortality of the disease can only be arrived at, I should consider, after years of careful observation, and from statistics carried over a long period and dealing with very large numbers. I think the outlook for inoculation is hopeful. Immunity is a relative term. While we cannot consider an inoculated person immune, I hope that we can consider that he has got an increased power of resistance.

An important question in relation to inoculation is, can it be considered entirely free from harmful results? With regret, I must state that it cannot. I have seen at least one case where inoculation markedly lowered the health standard of the individual. He was never well after his inoculation, and ultimately developed enteric fever some months afterwards.

The mortality in the cases under our care during the whole of the attack, was 10·7 per cent. Of these, two cases started their fever with a damaged heart, and died of cardiac failure. Perforation occurred in three cases. One was admitted perforated with a view to operation, but was found too near death for any operative measures to be undertaken. One case was operated on a very few hours after perforation, but at the time of operation he was very ill with dilated right heart and œdema of the lungs, and gradually sank and died. Of the remaining cases one died of hæmorrhage, one of bronchitis 19 days after tracheotomy for œdema of the glottis, and the rest from general exhaustion from the severity of the attack and the pronounced toxæmia.

Dysentery in South Africa is a fairly common disease, of it we saw some forty cases. Of those a number were of the catarrhal variety. About half were of the more severe type. It is interesting to note the rarity of the amœba coli in the cases. We thought we found the parasite twice, but could not be absolutely certain. This experience is in line with that of other observers in South Africa. As regards treatment, one would say that if the case is of the mild or catarrhal type, sulphate of magnesia or castor oil and chlorodyne are the best remedies. If the case is of the severe type, the question is more difficult. One would not then advise sulphate of magnesia. In some cases it seemed that its use was only stopped before it had hastened the demise of the patient. In some cases, ipecacuanha *with, not without* ematin, seemed to act like a charm. In one or two cases no drug seemed to have any influence, and the condition only improved when all drugs were stopped by the mouth and morphia given hypodermically.

Of the general cases in hospital one might dilate for hours, but there is only one more point which might be brought before the Society to-night. It is the condition which we came to describe as the " soldier's heart." A large number of these cases came under observation. It was found in men who had been engaged with arduous marching for months on end. There was *no* history pointing to a previous valvular defect, and no anterio-sclerosis or kidney lesion. There was complaint of shortness of breath and general weakness. The area of cardiac dulness was increased laterally, especially on the right side. There was a systolic murmur present, with its point of differential maximum intensity at the tricuspid area, a venous pulse in the neck, and apparently no mitral lesion. I take it that there was dilatation of the right side of the heart from over strain, and consequent tricuspid regurgitation.

I hope that I have not unduly trespassed on the time of the Society, but I feel that some of the points noted are well worthy of thought and discussion, and I hope to gain information by bringing them up to-night.

GASTRIC HÆMORRHAGE AND ITS SURGICAL TREATMENT[1]

By A. W. MAYO ROBSON, F.R.C.S.,

Senior Surgeon to the General Infirmary at Leeds, Emeritus Professor of Surgery in the Yorkshire College of the Victoria University

MR PRESIDENT,—I can assure you that I feel it a very high honour to be asked to address so distinguished a society as the Edinburgh Medico-Chirurgical; and as the northern capital has for ages been such a stronghold of medicine, I should almost have hesitated in venturing on another trespass of surgery, had I not felt that the opinion held by many practitioners of medicine "that bleeding from the stomach, the result of ulceration, rarely proves fatal," requires carefully reconsidering, and the facts remarshalling and looking at also from the surgical point of view.

Just as in other internal hæmorrhages, bleeding from the stomach was until quite recently a subject that, so far as treatment is concerned, only came under the notice of the physician; and it is only since the advances in surgery have demonstrated the feasibility and safety of exploring the abdomen, that the question of the surgical treatment of hæmatemesis has been a subject that could be discussed with advantage in a mixed medical and surgical society.

Were it desirable, the time at my disposal this evening would render it impossible to consider all the varieties of hæmatemesis. I shall therefore confine my remarks altogether to the most common, and certainly the most important cause of gastrorrhagia, simple ulcer, leaving out of consideration the vomiting of blood from cirrhosis of liver, cancer of stomach, miliary aneurism, aneurism of aorta and other vessels, purpura, scurvy, heart disease, leukæmia, typhoid fever, and other more obscure conditions only amenable to medical treatment.

When it is borne in mind that gastric ulcer occurs in 5 per cent. of the community, and that, according to Brinton, Habershon, Müller, Dreschfield, Lebert, and others, the mortality from all causes in all cases of ulcer is from 10 to 50 per cent., it must be at once allowed that the consideration of the subject is

[1] Read before the Medico-Chirurgical Society, Edinburgh, on February 6th, 1901.

a matter that should claim the attention of the profession to a greater extent than it has hitherto done.

Its importance will be better grasped if these figures are applied to the population of a city like Leeds, which, for convenience, I will take at 500,000. Of this number, 25,000 may be supposed to have or to have had ulcer of the stomach, and out of these, taking the mean estimate of mortality at 25 per cent., though this is under the mean as given by the authorities named, 6250, or 12,500 per million of the population, may be expected to die from gastric ulcer or some of its complications.

When it is fully grasped that many of the complications can only be dealt with successfully by surgical means, and that even in the mildest cases of gastric ulcer, some of the most serious complications, such as perforation and hæmorrhage, may suddenly supervene, I think that my audience will agree with me when I express an opinion that physicians and surgeons should in the treatment of these serious cases be in closer touch and have a more perfect understanding, so that valuable time may not be lost when surgical interference is required.

At present I have no hesitation in expressing my conviction that the treatment of gastric ulcer, especially among the working classes, is altogether too careless and unscientific, and I feel sure that the out-patient treatment of such cases, whether in hospital or private practice, is absolutely wrong, and attended with great danger, either of sudden catastrophe from rupture or bleeding, or of the transformation of an acute into a chronic disease, which can then only, in the greater number of cases, be set right by a surgical operation.

I think that as soon as gastric ulcer is suspected, the patient should be told the serious nature of the disease and the uncertainty of cure without rest in bed and long continued care in diet under proper medical supervision. If then, from business or other reasons, the advice of the medical attendant is ignored, the blame rests on the patient and not, as at present is so often the case, on the slipshod method of aiming at relief and calling it a cure.

Fortunately the surgical treatment of chronic and recurring gastric ulcer and its complications is becoming more and more advocated, and with increasing experience more and more perfect, so that to-day the tale is very different to what it was even

a year ago, when I gave a series of lectures on the subject from the Hunterian Chair at the Royal College of Surgeons of England. I was then able to collect from all sources 188 cases of operation for chronic gastric ulcer, including thirty-four of my own, but excluding operations for perforation and hæmorrhage; out of these 31 died, giving a mortality of 16·4 per cent.; but my recent experience in a largely extended number of cases shows barely a mortality rate of 5 per cent., and as all the patients were either chronic invalids or ill unto death, that means a saving of life in 95 per cent. of the cases, either by gastro-enterostomy, gastroplasty, pyloroplasty, pylorectomy or gastrolysis.

I must now confine myself to my special subject for this evening, the complication of hæmorrhage, which, according to different authorities, occurs in a greater or less degree in from 50 to 80 per cent. of all cases of gastric ulcer, and is, according to various authors, fatal when medically treated in from 2 to 3 per cent. (Müller 2 per cent., Welsh 3 to 5 per cent., Brinton 5 per cent., Debove 5 per cent., Steiner 6·36 per cent., Lebert 3 per cent., Dreschfield 3½ per cent., Rodman 8 per cent.). If we take the average, 7 per cent. of deaths in cases of gastrorrhagia from ulcer will not be far from the truth. If this is worked out in the 500,000 population of a city like Leeds, it means that of the 25,000 persons who have or have had ulcer, 12,500 suffer from hæmatemesis, and of these 7 per cent. or 875 die.

We are therefore dealing with a very serious and common accident, and one which a society composed of experienced physicians and surgeons such as are here assembled can do real good by discussing.

The bleeding may be arterial, venous or capillary, and curiously, capillary hæmorrhage may be so free as to render it difficult to say that some large vessel has not given way, yet after death a careful examination may fail to discover any gross vascular lesion.

Although capillary hæmorrhage may supervene on other conditions, such as congested portal circulation, enlargement of the spleen, and general engorgement of the venous system, when general treatment will usually be all sufficient, yet there are two special conditions in which the bleeding may be so-

free as to raise the question of surgical treatment: these are vicarious hæmatemesis at the menstrual period, and post-operative hæmatemesis. The former condition is well recognised and usually yields to medical treatment. Petersen's experience of surgical treatment in three cases terminating fatally after operation would not encourage surgical intervention unless the circumstances of the case were very exceptional.

In my Hunterian Lectures, I drew attention to post-operative hæmatemesis, of which I have seen several cases, three fatal. The cases occurred after operation for intestinal obstruction, tubercular peritonitis and herniotomy, or after gall-bladder operations. Other cases have since been reported: one by Dr Winslow in a stout woman of 65, after operation for unbilical hernia, where death occurred from profuse gastrorrhagia on the third day, and at the *post-mortem* examination, though the stomach and intestines contained a large quantity of blood, no vascular lesion could be discovered; and another by Mr Mansell Moullin, in a young man of 23, who died from profuse hæmatemesis within forty-eight hours of a simple exploratory incision in the left iliac fossa. It was then neither generally recognised nor well understood, but since that time several papers have appeared on the subject both at home and abroad, and though now fully recognised its cause remains obscure. Herr Eiselberg tried to explain it as a result of injury to the omentum from several cases observed in the Konigsberg Klinik occurring after hernia operations, after operations involving ligature of the omentum, and after torsion of omentum. Although this explanation may serve as a cause, it does not account for all cases, as proved by one of my own, in which a malignant tumour of the common bile duct causing jaundice and distended gall-bladder was operated on under cocaine, the distended gall-bladder being simply exposed through a small incision, stitched to the parietes and drained, without in any way exposing any other viscera, yet violent hæmatemesis set in the day after operation and proved fatal in three days.

This case also disproves two other theories that have been advanced: one that general anæsthesia is the cause, and another that sepsis affords an explanation; the latter being a theory

suggested by Dr Rodman in his oration before the American Medical Association in June 1900.

That sepsis was not the explanation in the only three cases in which I have had the opportunity of observing the conditions after death is undoubted, for in each there was no sign of peritonitis or other septic trouble, and moreover there was no gross evidence of ulcer or injury to any vessel of sufficient size to be visible to the naked eye.

The theory of sepsis is also negatived by recovery in the greater number of cases, and by there being no sign of distension or of the other usual concomitants of septicæmia when it occurs after abdominal operations.

The only explanation that seems to me at all feasible is that the hæmorrhage is dependent on a reflex nervous influence, and it is quite possible that this same explanation applies to vicarious hæmatemesis at the menstrual period; but it should also be remembered that slight erosion of the mucous membrane of the stomach sufficiently deep to cause severe gastrorrhagia may be almost imperceptible to the naked eye, even when searched for carefully on the *post-mortem* table.

Though serious it is not necessarily fatal, and I have known several cases to yield to general treatment such as high injections of hot water at a temperature of from 112° to 116° as advocated by Tripier, free purgation by calomel, the stopping of all mouth feeding, and the application of ice to the epigastrium, etc.

In post-operative hæmatemesis, operation can be seldom feasible or advisable, and Reichard's experience of operations followed by death in two cases would lead me in the future as in the past to rely on general rather than on surgical treatment.

Venous hæmorrhage, if from perforation of one of the large trunks such as the coronary, splenic, or portal, may cause rapid death; but owing to the diminished pressure in the veins and the more languid circulation, a rapidly fatal result is less likely than in arterial bleeding, and should the hæmorrhage persist or recur, such cases would be likely to benefit by surgical treatment.

Arterial bleeding is mostly responsible for the serious and fatal hæmatemesis due to gastric ulcer. The bleeding may be from the small arterioles which radiate between the peptic

glands, from the trunks along the curvatures, the coronary being the most frequently affected, or from extrinsic arteries, the splenic alone being responsible according to Brinton for 55 per cent. of the deaths in fatal hæmatemesis.

The following analysis of 54 fatal cases of hæmatemesis is taken from Savariaud's Thesis :—

Ulcerations of the splenic artery	17 cases.
„ „ coronary artery	6 „
„ „ pancreatico-duodenal	7 „
„ „ gastric arterioles	10 „
„ „ branches of the coronary vein	2 „
„ „ other veins	2 „
Vessel not determined	2 „
No vascular orifice visible	4 „
Vessel not mentioned	4 „

The pancreatico-duodenal and right gastro-epiploic are the arteries chiefly affected in pyloric and duodenal ulcers.

The peculiarly fatal nature of hæmorrhages from medium-sized arteries depends on the fact that an ulcer makes a lateral opening into the vessel which prevents natural hæmostasis by retraction and contraction of the artery. The whole force of the heart is then exerted on the clot which tends to form during the syncope that usually occurs when a large quantity of blood is suddenly poured out.

The interval between the first onset of bleeding and death is of great importance surgically, and is well shown in the table from M. Savariaud's Thesis, which is therefore worthy of note.

Vessel.	No. of Cases.	Sudden Death.	Rapid Death.	Survived Considerable Time.
Heart	4	1	1	2 (3 days)
Aorta	2	0	1	1 (10 days)
Hepatic	2	0	1	1 (10 days)
Splenic	17	3	7	7 (2 to 8 days)
Coronary	6	1	3	2
Pancreatico-duodenal	6	1	3	2 (8 to 15 days)
Arterioles	10	1	1	8 (4 to 15 days)
Small veins	4	1	1	2 (7 to 11 days)
Invisible veins	3	0	1	2 (21 days)

It shows that in the present state of our knowledge it is impossible to diagnose the size of the vessel perforated either from the amount of blood lost or the length of survival.

A probable diagnosis of the site of the bleeding may, however, often be arrived at in hæmatemesis from ulcer, by a careful study of the previous history, especially with regard to the site of pain, the time of onset after food, and the influence of posture on it, as well as by the way in which the pain radiates. The situation of the tender spot, the presence or absence of tumour and of dilatation or contraction of the stomach also afford assistance.

As will be seen later, the diagnosis of the site of the ulcer, and therefore presumably of the bleeding, is of great importance from a surgical point of view, and will influence both the advice given as to treatment and the method of procedure when the abdomen is opened.

Treatment.

From the fact that medical and general treatment is successful in arresting hæmatemesis in 93 per cent. of cases, and that it is difficult in the present state of our knowledge to say at first that the bleeding is not occurring from capillaries or small arterioles, it necessarily follows that medical treatment should always have a fair trial in every case of acute hæmatemesis. The very fact of medical treatment being so often successful in cases of apparently alarming hæmatemesis goes to show that capillary oozing or bleeding from arterioles is much more common and accounts for many more cases of gastric hæmorrhage than has hitherto been supposed; but while thoroughly believing this, we must also not close our eyes to the experience we have in general surgery of bleeding from medium-sized arteries, such as the radial or ulnar, which we know would rapidly bleed a patient to death, if only perforated on one side and surrounded by warm compresses, a condition that practically applies in all cases of hæmatemesis where the larger vessels are eroded.

If, therefore, medical treatment and rest properly carried out are not successful in arresting the bleeding in a few hours, or if after being arrested it recurs, we should be driven to the conclusion that a large vessel is perforated; and if a surgeon

has not been previously asked to see the case, I would say emphatically that a surgical consultation ought to be held with a view to considering the question of operation and immediate arrest of the bleeding by direct treatment if the patient is in a fit condition to bear it, just as would be the case if an ovarian artery were bleeding in a case of ruptured extra-uterine gestation, or a brachial or radial after an accident.

The views I am enunciating to-day are perhaps more pronounced and more emphatic than those I expressed a year ago in my Hunterian lectures, this being the result of a much extended experience in the surgery of the stomach, a much greater success on all hands in the surgical treatment of stomach diseases, and a careful study of more recent statistics.

An analysis of the table by M. Savariaud of fifty-four cases showing the prolongation of life in various fatal cases of hæmatemesis, demonstrates that in ten out of fifty-four, that is in 18·5 per cent., death occurs so rapidly that there is barely time to consider the question of surgical treatment, and that in seventeen out of the fifty-four, which equals 31·4 per cent., death occurs within from twenty-four to thirty-six hours after the first appearance of hæmorrhage. Now although at present these cases are often allowed to die without operation, yet if the bleeding were from a radial or tibial, or any accessible artery, they would all be saved by the simple operation of direct ligature of the bleeding vessel, which operation would also cure the bleeding stomach artery could it be readily found. The difference between the two is, however, not only one of accessibility, but also one of diagnosis; for if we are able to diagnose capillary hæmorrhage, the case will be generally one for medical treatment alone, but if the time arrives when we can diagnose with great probability arterial hæmorrhage from a large vessel the case will, I believe, be considered one for the adoption of surgical measures.

Our efforts both as physicians and surgeons must therefore be directed towards making a diagnosis of the size of the damaged vessel, for if it can be asserted that in all probability a large artery has given way, an operation could be undertaken in an early stage of the case before exhaustion and profound anæmia have supervened, with great probability of success.

Where there have been distinct signs of gastric ulcer pre-

ceeding the hæmorrhage, and where a sudden hæmatemesis has occurred with great loss of blood accompanied by an attack of syncope, a large vessel will usually be found to be the source of the bleeding. In all such cases not speedily yielding to medical and general means, surgical treatment will probably in the future be carefully considered, and in some it will be followed out, for there can be no absolute rule formulated that will apply to every case, and each must be considered on its merits; the present condition of the patient, the previous history, the surroundings, the possibility of skilled surgery and of good nursing and other circumstances will all help in the decision.

Although both surgical and medical treatment in cases of fulminating hæmorrhage has so far yielded disappointing results, in the remaining 50 per cent. of fatal hæmorrhages, where repeated bleedings occur and the interval between the first seizure and death varies from a few days to two or three weeks, medical treatment will have been fully tried and failed, and there can be no question as to the advisability of surgical procedures being adopted.

At present, with the exception of Dieulafoy, who advocates operation during the first bleeding if as much as half a litre of blood is lost, all other surgeons who have written on the subject agree that general means ought to be relied on during and after a first attack, as in from 93 to 95 per cent. of cases such treatment succeeds, and until our means of diagnosis as to size of vessel injured is rendered more reliable we must assent to this rule; but after a second bleeding, I have no hesitation in advising operation even during the course of the hæmorrhage if the patient can stand it, or as soon after as his condition will permit the operation to be done, for experience tells us that further hæmorrhages are almost certain to occur unless preventive measures be adopted. I saw a case of this kind last year which created a great impression on my mind. I was asked to see a single woman, close on thirty, with a view to operation after a second attack of hæmatemesis, which had, however, ceased when I saw her; and as the patient, though anæmic, was apparently much easier and expressed herself as feeling well, operation was deferred, and a third attack, which occurred a few days later during my temporary absence from home, proved fatal.

In another case, I operated during the third attack, found the bleeding vessel, and saved the patient.

Doubtless the desirability of stopping bleeding from an ulcer of the stomach by surgical means must have occurred to many minds before being put into execution.

To Mikulicz, however, belongs the claim of having been the first to operate for hæmorrhage from a gastric ulcer on February 13th, 1887, though Roux, of Laussaune, was the first to perform a successful operation, and that in a case of hæmorrhage from the coronary artery, in which he excised the ulcer and ligatured the artery at both ends. In my Hunterian lectures I drew up a table of all the cases of operations for hæmatemesis I could then find. It included operations for post-operative and vicarious hæmorrhage, cases not associated with ulceration and all ending fatally. Excluding these, and correcting Hartmann's series, it would give 26 cases of acute hæmatemesis with 14 deaths, and 19 cases of chronic hæmatemesis with 2 deaths, otherwise a mortality of 53·8 per cent. in acute and of 10·5 per cent. in chronic hæmatemesis treated surgically. A more recent table has been drawn up by Dr Rodman (*Philad. Med. Jour.*, June 9, 1900), in which he has collected 32 operations for acute gastrorrhagia with 13 deaths, or a 40·6 per cent. mortality, and 31 operations for frequently recurring or so-called chronic hæmorrhages with 6 deaths, or a mortality of 19·3 per cent.; and even since that list was drawn up, other operations have been performed. This mortality is very high, but it must be remembered that in every case medical treatment had been first tried, and in many of the cases probably over too long a period before operation was performed: for instance, in one of my cases in which I operated successfully during the third seizure, the blood seen at the operation was so diluted and thin as to be more like water tinged with blood than blood itself, yet the bleeding was still going on. Moreover it is to be remembered that gastric surgery is advancing in safety and efficiency by leaps and bounds and will before long, I feel sure, be one of the most satisfactory branches of the surgeon's work.

Principles of Operation for Gastrorrhagia.

On account of the fear of exciting fresh hæmorrhage, it is undesirable to wash out the stomach before operating on a

bleeding ulcer, and as the patient is usually anæmic and will therefore bear shock badly, it is desirable to have him enveloped in cotton wool or otherwise kept warm on a heated table, and to give him a subcutaneous injection of strychnine before operation. If it be unnecessary to infuse saline fluid before the operation, an assistant should be ready to perform that duty while the abdominal operation is being proceeded with should it be called for. After the abdomen is opened, the stomach may be emptied by pressing the contents into the duodenum, as suggested by M. Terrier. This saves much time, and rapidity is of great importance. The surface of the stomach should then be carefully examined, as very frequently a puckering of the surface or thickening of the coats will be noticed at the site of the ulcer, or a difference in colour may sometimes indicate its site. Should the operator be fortunately able to find these indications much time may be saved but if no indications of this sort be obtainable, the stomach must be drawn well forward and opened either by a vertical incision, which gives less hæmorrhage, or by an incision in the long axis of the stomach, which affords a much better view of the interior. In order to avoid soiling the peritoneum, thin flat sponges should be placed within the abdomen, and it is well to have a perforated sterilized gauze pad covering the stomach, the opening to correspond with the opening in the stomach. The edges of the stomach should then be held open by forceps, one above and below and one at each end.

The interior of the stomach must now be systematically examined, first the anterior and posterior surfaces, then the upper and lower curvatures, and lastly the pyloric and cardiac orifices, all of which can be done by the naked eye or by the aid of an electric cystoscope or a reflected light. If the posterior wall of the stomach cannot be efficiently examined, a slit may be made in the omentum and two fingers, or even the whole hand, pushed through it and employed to invaginate the posterior wall. If no ulcer can be found on the wall of the stomach the duodenum should be explored, not only by the finger, but by invagination. If no ulcer be found anywhere and the bleeding proves to be capillary or from small undiscoverable ulcers, gastro-enterostomy should be performed; but if an ulcer be discovered and it be possible to excise it,

that operation should be done, as it undoubtedly offers the likeliest method of cure. After excision of the ulcer and ligature of the bleeding vessels the edges of the wound are brought together by sutures, of which one or two layers may be employed. Should the excision involve the peritoneal coat, it is desirable to apply Lembert's sutures; and if it be on the posterior wall, the operation may present some, though not insuperable difficulty. Should the ulcer be discovered in some region where excision is impracticable—for instance, near the cardiac end—the method adopted by Mikulicz, in his first operation in 1887, of applying the cautery, may be employed. This seems to have answered well in several cases, and where death occurred afterwards it was not from a recurrence of the bleeding. In a case of this kind, gastro-enterostomy is also advisable by way of setting the stomach at rest. If any superficial bleeding points be discovered they may be caught up by forceps and ligatured, but this is more easily said than done, as the mucous membrane is very friable, and a ligature if drawn at all tightly tends to cut its way through; moreover, forceps easily tear the mucous membrane and may produce a larger bleeding area. The method of ligature *en masse* may be employed if the ulcer is small; it has proved serviceable in several cases, for instance in Case V., which will be described presently, and it is easy of application when the ulcer can be reached. It has been tested by experiments on animals by Dr Eisendrath, but has been shown to endanger perforation if the serous coat be taken up, except when supported by external sutures. Ligature of the main arteries of the stomach was suggested theoretically by Savariaud when no bleeding ulcer could be discovered; it does not, however, commend itself as being safe or likely to be efficient.

Should the bleeding be from an ulcer at the pylorus, the operation of pyloroplasty may be performed, the ulcer being excised and the edges of the gap left by the excised ulcer as well as the edges of the incision being united, so that the line of sutures shall be transverse to the axis of the pylorus. I would not, however, advise pyloroplasty when there is active ulceration of the pylorus unless the ulcer can be completely excised, for in three cases of this kind I have had subsequent disappointments owing to contraction in healing. In one case

the patient made a good recovery from the operation but subsequently suffered from stenosis, for which a further operation had to be done. In a second case, recovery took place, and the patient regained his lost weight, but subsequently a tumour of the pylorus developed which was thought to be cancer and for which I had to perform pylorectomy, and in the third case perforation subsequently occurred. I think, therefore, that in cases of ulcer of the pylorus where a clean excision of the ulcer cannot be done, it would be better to perform gastro-enterostomy or pylorectomy, whichever at the time may appear to be easier.

Wherever the pylorus is adherent, as in my experience it is in so many cases of ulcer, I should certainly prefer gastro-enterostomy; but if the pylorus be extensively ulcerated and free from adhesions, pylorectomy can be almost as quickly performed as gastro-enterostomy, seeing that the pylorus is already in the hand. Although the operative treatment of parenchymatous or capillary hæmorrhage by any surgical method would seem to be of doubtful value, for according to a report by Petersen from Czerny's clinic of three cases operated upon for severe parenchymatous hæmorrhage from vicarious menstruation, operation entirely failed to relieve, and of two other cases of post-operative parenchymatous hæmorrhage by Reichard, both died, yet if such cases, owing to persistence seem to call for operation, then gastro-enterostomy, by securing complete physiological rest, would seem to offer the best chance of success.

In performing gastro-enterostomy my recent experience has led me to prefer the posterior operation, which I have modified by using my decalcified bone bobbin as a hollow splint over which to apply the double continuous suture uniting the mucous and serous margins of the openings between the viscera, thus securing an immediately patent channel between the stomach and jejunum and a temporary protection to the line of union.

I may say that my last twenty gastro-enterostomies by this plan have all recovered without regurgitant vomiting or other untoward symptoms, thus affording a great contrast to what has occurred in the anterior operations both in my own and the hands of other surgeons.

The conclusions I would urge concerning the treatment of gastric ulcer are that—

(1) All cases of acute uncomplicated gastric ulcer should be submitted to thorough medical treatment in the shape of long-continued rest and attention to diet, the cases not being allowed to get up or to resume solid food until at least a fortnight after all disappearance of pain.

(2) Where the ulceration persists and proves intractable to medical treatment, or where relapses occur, gastro-enterostomy should be performed, so as to secure physiological rest and relieve the hyperacidity of the gastric juice nearly always found in such cases.

(3) Perforation demands immediate surgical treatment.

(4) The complications of disabling adhesions around the stomach and pylorus, pyloric contraction and hour-glass contraction due to chronic ulcers leading to pain, dilatation, loss of flesh and general impairment of health, and now often treated as chronic indigestion, should be treated surgically.

(5) In recurring, or so-called chronic hæmatemesis from gastric ulcer, surgical treatment is decidedly called for.

(6) In acute hæmatemesis, further accuracy in diagnosis as to the size of the bleeding vessels is urgently needed; and the co-operation of the physician and surgeon is advisable in all cases of hæmatemesis, so that if relief be not obtained by medical and general treatment, surgical means may be adopted if the bleeding is believed to occur from a large vessel; but seeing that capillary hæmorrhage is capable of relief by medical means alone, medical should always precede surgical treatment.

The following are brief descriptions of all the cases of hæmatemesis on which I have operated:—

CASE I. Chronic hæmatemesis—ulcer of pylorus—pylorectomy.

In 1891, I was asked by a medical friend to see a man of 54, who for six months had suffered from pain coming on an hour after food, and more recently from vomiting of blood of coffee-ground character in considerable quantities, so that he was not only reduced in flesh and strength, but had been rendered profoundly anæmic by the loss of blood.

A tumour of the pylorus could be easily felt, and the stomach was markedly dilated.

As he was rapidly losing ground I operated, and found the pylorus thickened and nodular, with adhesions to the liver and omentum.

After separating the adhesions, the pylorus was excised and the open end of the duodenum was fixed to the opening in the stomach, the rest of the stomach aperture being closed by a double layer of sutures.

The tumour proved to be inflammatory around an open ulcer which had been the source of the hæmorrhage. The bleeding was not repeated, and the patient rapidly gained flesh and returned home within the month.

CASE II. Hæmatemesis following on stab wound of abdomen—abdominal section.

On January 27th, 1897, a young mechanic, aged 20, was admitted to the Leeds General Infirmary, under my care, with free vomiting of bright blood following on a stab wound of the abdomen, the wound having been inflicted by a long, fine, triangular file, that had caught in the lathe at which the youth had been turning.

On admission he was pale and collapsed, with a pulse of 190, and as there were signs of free fluid in the peritoneal cavity, it was thought that the stomach had been perforated, and that the bleeding was from a ruptured gastric artery.

On opening the abdomen a large quantity of blood and clot was found free in the abdominal cavity and in the kidney pouches and pelvis, but on examining carefully the stomach no perforation could be found. After some searching the superior mesenteric vein was found bleeding freely, the file having bruised and pushed aside the stomach, pierced the great omentum and then wounded the vein.

The abdomen was washed out with hot water after the vein had been ligatured, and this also arrested the gastrorrhagia, as the patient made a good recovery and had no further hæmatemesis. The shock was relieved by the infusion of three pints of normal saline solution into the median basilic vein and by injections of liq. strychniæ.

CASE III. Acute hæmatemesis from ulcer of duodenum eroding gastro-duodenal artery—anterior gastro-enterostomy with Murphy's button.

I was asked by my colleague, Dr Churton, to see a man,

aged 36, who after a year's history of ulcer of the stomach with great loss of flesh and strength, was suddenly seized with profuse hæmatemesis, which was followed in twenty-four hours by a second seizure when I saw him. He was then extremely weak, and very thin and anæmic, and looked as if he must die if further hæmorrhage occurred. His pulse at the time of operation was 150.

The history clearly pointed to the pylorus as being the seat of bleeding, but the patient was too ill to bear pylorectomy, and an anterior gastro-enterostomy was performed by means of a Murphy button, the whole operation occupying only fifteen minutes. He bore the shock well, and for five days made good progress; on the sixth day he was suddenly seized with severe abdominal pain, and from that time he lost strength: vomiting set in on the eighth day, and he died on the tenth. No further bleeding occurred, and at the necropsy a duodenal ulcer opening into the gastro-duodenal artery was found. The cause of death was peritonitis, the result of a leakage when the button began to separate.

So far as the hæmorrhage was concerned, the gastro-enterostomy had been completely successful, and the vessel, though perforated at one side, was occupied by a firm clot.

CASE IV. Mr C., aged 44, was sent to me by Dr Peter Macgregor of Huddersfield, on the 2nd of January 1900, with the history that he had had pain after food together with other symptoms of gastric ulcer for four years, though his first attack of vomiting blood occurred in May of the previous year. The bleeding was rather profuse, but under medical treatment and rest he recovered, and was able to resume his occupation. A week before he was sent to me there had been a recurrence of the hæmorrhage, which was repeated three days later.

On his arrival at the surgical home he was in a state of collapse with a barely perceptible pulse. There was well marked dilatation of the stomach with tenderness over the pylorus. The history of the pain occurring one and a half hours after food, together with the site of the tenderness, and the presence of a large amount of blood in the motions, left no doubt but that the ulcer was at or near the pylorus. As the bleeding had recurred twice in the week and was probably persisting and passing into the bowel, operation was decided on.

This was done on January 4th. As the patient was in such a feeble condition every precaution was taken to guard against shock, and it was decided only to perform gastro-enterostomy, as it was quite clear that he would not stand any prolonged search for the bleeding point.

A posterior gastro-enterostomy was therefore done, a decalcified bone bobbin being used to make the anastomosis. His temperature and pulse were never above normal, and he made an uninterrupted recovery. He was fed by nutrient enemata for the first few days, only taking sips of water by the mouth, but at the end of that time he was allowed to take milk and soda water, and then gradually to have stronger food. He was up at the end of the third week, and returned home within the month. A year later he was in perfect health, and had had no recurrence of his stomach symptoms nor any further bleeding.

CASE V. On July 6th I was asked by Dr Humphery, of Armley, to see a patient, Mrs H., aged 33, who had been seized with violent hæmatemesis a week previously, the attack having recurred four days later, and again on the day that I saw her. The patient had been anæmic before operation, and had had some slight indigestion, but otherwise did not consider herself ill, and she had been married only three months. On my arrival I found her quite blanched, and with a very rapid feeble pulse, but as the bleeding had resisted ordinary remedies, and as she was clearly going to die if unrelieved, though it seemed a rather desperate procedure, we decided to give her the chance of relief by operation. She was removed by ambulance to a surgical home, and as during the journey the bleeding began again, I operated without delay. A pint of saline fluid containing one ounce of brandy was given into the rectum, and 10 minims of liq. strychniæ were administered just before the operation, the patient being completely enveloped in cotton wool. On opening the abdomen there were no indications on the surface of the stomach as to the situation of the bleeding ulcer. I therefore made an incision in the axis of the stomach, which enabled me to explore the interior. I counted no less than seven bleeding points. As two of them were bleeding freely, I took them up by artery forceps and ligatured the mucous membrane *en masse*, the other points

stopped on exposure to air. I then rapidly closed the wound in the stomach, and performed posterior gastro-enterostomy, using one of my bone bobbins as a splint over which to make the anastomosis. We had a little anxiety on account of shock for the first twenty-four hours, but by administering saline fluid by the bowel and injecting it freely into the subcutaneous tissue, together with the administration of several injections of liq. strychniæ, the difficulties were tided over, and the patient's further progress towards recovery was uninterrupted. She was able to take solid food in the second week, and when she left at the end of the month, she could eat any ordinary food without discomfort. Six months later she had had no recurrence of symptoms, and was well in every respect.

Five is not a large number of cases to report, but the treatment of hæmatemesis by operation is a comparatively new operation, and only few cases have been reported. Had it not been for the accident of leakage when a Murphy button was beginning to separate there would have been no casualty in the list, and that is an avoidable accident by employing sutures around a decalcified bone bobbin, which is now my regular custom. Undoubtedly without operation all the patients would have died. The cases present individual points of interest.

In the first case a pylorectomy was performed as the pylorus was the site of a tumour that might have been malignant, though could it have been asserted that the enlargement was simply thickening around an ulcer, gastro-enterostomy would have answered equally well as it did in the third and fourth cases, by securing physiological rest and freedom from the irritation due to hyperacidity of the gastric juice which is usually present in ulcer of the stomach.

In the second case, hot lavage acted in the same way that it does when given by high injections into the bowel, only in this case it was necessary to open the abdomen to search for and ligature the large vessel bleeding into the peritoneum.

The fifth case illustrated the feasibility of exploring the stomach even in a patient brought very low by excessive loss of blood ; and although the ligature of the chief bleeding points was effected, it was deemed advisable to secure rest to the stomach by performing a posterior gastro-enterostomy, espe-

cially as it could be done without materially prolonging the operation.

It only remains for me to thank you for giving me such a patient hearing, and to hope that the discussion which is to follow may prove of interest to the Society and useful to the profession at large.

Discussion.

Dr Affleck, in opening the discussion, was sure that they had listened to the paper just read with interest, pleasure, and profit. The subject was one of great importance, and as they had listened to Mr Mayo Robson's narration of facts and cases, he was sure that they must have felt that the results which he had attained were to be ascribed not merely to surgical aptitude and dexterity, but quite as much to careful study and thought, to sound judgment, and to large clinical experience. It was difficult in the short time at his disposal to follow Mr Mayo Robson through the many important statements which he had made. His treatment of the subject was largely from the surgical point of view, so that he (Dr Affleck) could only speak on one or two aspects of the subject. But perhaps a comparison of experiences, even though it were a comparison of small things with great, might not be altogether unprofitable; and particularly in a subject like this, where further information is desirable. The subject was one of exceeding interest both to physician and surgeon. Not long since it was only interesting to the physician, but it was a conspicuous feature of modern surgery that it had boldly entered into territories previously deemed inaccessible, and had grappled successfully with problems and conditions that were formerly regarded as hopeless; and speaking as one who had had some considerable experience in the surgery that comes to the aid of medicine—particularly the surgery of the abdominal cavity—he confessed to a feeling of constant gratitude to the science and art of surgery for what it had been able to do in co-operation with the physician in the saving of life and the relief of suffering; and he thought there was promise in the future of still more to be done by surgery for medicine.

With regard to hæmatemesis, and confining himself to gastric ulcer as a cause, although it arose from many other causes, he would make a few remarks, firstly, in reference to diagnosis, and, secondly, in reference to treatment. In regard to diagnosis, it was the case that no one symptom was an absolutely certain diagnostic sign of gastric ulcer, but there was often clinical evidence that was very valuable,

and the physician might oftentimes be almost certain. There were one or two points which he might mention in connection with what Mr Mayo Robson had said as to being able to diagnose the character of an ulcer by certain symptoms. With regard to the pain, for instance, he was sure they could not always rely upon the evidence furnished by this symptom as to situation, acuteness, or chronicity of the ulcer. He found in his experience that the pain of gastric ulcer was rather misleading. It had been stated that when the pain arises immediately after the ingestion of food the ulcer is likely to be seated at the cardiac end of the stomach, but that if it comes on later, the probability is that it is at the pyloric end. He was not sure that they could attach very much importance to this, because he doubted very much if the pain was due to the contact of food with the ulcer, and not rather to the setting agoing of the active work of the stomach, the ingestion of food causing increased movement and the secretion of gastric juice in abundance. In this he might be wrong, but he had seen cases in which the *post-mortem* examination did not confirm what the symptoms suggested. He had a case, for instance, of severe gastric hæmorrhage where the patient complained of pain not in the epigastrium at all, but in one of the iliac fossæ. They knew the pain was often a referred pain, just as in the case of pleurisy and others. Nor was the decubitus of the patient altogether to be relied upon. Still these were important points, and he thought Mr Mayo Robson had been fortunate in his diagnosis. The use of chemical investigation of the vomit and contents of the stomach was often, he thought, of very great value, and no physician could afford to ignore that line of investigation in doubtful cases. In the case of ulcers of long standing they had accessory evidence—alteration in the size of the stomach, sometimes large and dilated, sometimes an hour-glass contraction, the presence of pyloric tumour, etc., these were all helpful in diagnosis. The method of introducing tartaric acid and bicarbonate of soda for the purpose of coming to a diagnosis as to the size of the stomach was, he thought, questionable. If an ulcer were present it might lead to rupture, although he had not seen any accidents of this sort on record. He had frequently been able to diagnose size by a much gentler procedure. Gentle friction of the skin with the hand sometimes makes the stomach stand up quite sufficiently to enable it to be clearly mapped out. He had even seen hour-glass contractions of the stomach at certain points clearly mapped out in this way. Of course some chronic ulcers did not bleed, nor did all acute ones; but the chronic ulcer is generally known by the recurring hæmorrhage after a con-

siderable time, and these were the cases which he thought were more suited for surgical treatment. The acute ulcers were characterised as a rule by the sudden onset of very violent hæmorrhage, occasionally fatal, not often immediately so, but by recurrences at intervals of a few hours over a day or two. A large number of these evidently undergo spontaneous arrest of the bleeding. With regard to treatment, he thought that in the case of acute ulcers they must trust largely to medical treatment in the first instance, though he wondered sometimes how far medical treatment contributed to the arrest of the hæmorrhage, or whether it really did not arrest itself. He had tried all manner of styptics, and had sometimes failed with them all. He thought morphia one of the best, along with absolute rest; and, in one of the worst cases he had met with, he had administered as a last resort very hot water, and that was followed by an arrest of the bleeding, whether due to this treatment or not he could not say. That most of these acute hæmorrhages undergo spontaneous arrest is a fact that the physician takes advantage of, and justifiably so, in trying to assure the patient and the patient's friends. He had found it often of the greatest service to be able to say that the bleeding was likely to stop in a short time, though of course we must not forget that a considerable number did prove fatal.

He was struck with Mr Mayo Robson's remarks as to acute gastric ulcer. He advocated that, after perhaps the second hæmorrhage, surgical interference should at least be proposed if the patient's condition admitted of it. In hospital work particularly, he thought the patient's condition would often not admit of it. Yet it was possible that by timely interference we might save lives sometimes. He thought, however, they wanted more evidence. He had a striking case in his mind. A hæmorrhage had occurred in a young woman some years ago. She was brought into the infirmary in a state of collapse, the history being rather that of a chronic ulcer, and she brought up blood largely, and passed it by the bowel largely. All means that could be taken to arrest the hæmorrhage were unavailing, and I am sure that Mr Mayo Robson himself would have been satisfied that it was not a case for surgical interference. She lingered two or three days, and died. At the *post-mortem* he had found no fewer than twenty ulcers in the stomach, and four in the first part of the duodenum. They were not merely erosions, but ulcers that had broken through the mucous membrane. There was a clot in one of these ulcers; but on consideration, he thought the bleeding must have come from most of them, as there was copious hæmorrhage downwards as well as upwards. It was an exceptional case,

but there were on record cases with even a larger number of ulcers. Of course, many acute ulcers that bleed largely underwent perfect healing. But even in the chronic ulcers, an effort at cure is made. It had been pointed out long ago that often a chronic ulcer might be seen where the cicatricial process was almost successful, but not quite. Some vessel is left open from which hæmorrhage takes place from time to time. These were the cases that seemed to call for surgical treatment. It was interesting to find that even in these cases a healing process was under way; but nature's efforts at healing a chronic ulcer were often very inadequate. The sequelæ of chronic ulcer were often the cause of a great deal of suffering, and in reference to these cases he was quite at one with Mr Mayo Robson. Patients might under treatment by rest, diet, etc., get apparently quite well; but were they well? They were not, and often came back again after years of suffering; it might be that life was curtailed. These cases also seemed to him to be specially suited for the intervention of the surgeon. In these chronic cases, however, much might be done by syphoning the stomach. He thought the introduction of this method of treatment of gastric disease was a great step in advance, and some patients would be content with the discomfort rather than face the formidable idea of surgical operation. They must remember that they had the patient to consider, who would often be more chary of submitting to operation for a malady of this sort than for a tumour or something which he could actually see. Surgical methods should not be lightly undertaken, but he thought that in cases of this sort physician and surgeon should be in touch. Unless the surgeon had specially studied the clinical history and symptomatology of gastric ulcer, he should not be without the co-operation of the physician in the matter. In conclusion, he would say that in some of these severe cases of chronic gastric ulcer we should at all events entertain the idea of the use of surgery more than we were wont to do. He would mention a case in which he had been interested. In September 1899 he had a young woman with gastric ulcer under his charge in the Royal Infirmary. It was a chronic ulcer, and she had had hæmorrhage some time before admission. After treatment by rest and rectal alimentation, etc., she apparently got well, but he never felt satisfied that she was quite well. She resumed her occupation, and shortly afterwards went to Paris. While there, some six months afterwards, she was seized with a violent hæmorrhage. She was taken to a hospital in Paris, and seems at once to have been put under surgical care. The operation of gastro-enterostomy was performed. She came home as soon as able to leave the hospital, and came again to the Infirmary here. One

would never have known her, she was so reduced, but under careful treatment she gained in weight, and left perfectly well. A wound was to be seen in the abdominal wall, but he could not have said what had been done had the surgeon not given the girl a little scrap of paper with a sketch of what had been done. He had perhaps taken up too much of the time of the Society, but he had a great interest in the subject which had been so ably placed before them by Mr Mayo Robson.

SIR WILLIAM GAIRDNER said that the first feeling he had after hearing Mr Mayo Robson's paper was one of intense relief that he was willing to leave still a little corner for the physician. He understood that the physician might be allowed to watch the case for a little until the surgeon should come in. From what was heard from some of their surgical friends he was not prepared for this much—the surgeons had been so aggressive of late years that it might be doubted whether there was any function for the physician at all. Take the brain for instance. What was a brain? they said. The physician had merely to say where the lesion was, and then to call in surgery. The kidney —well, the physician might fight with this for a little, but it ultimately came to this, that the surgeon had to be called in to remove the stone or remove the kidney. The stomach. What's a stomach? A thing that caused a lot of trouble; and when the trouble became too much—well, we could get on without a stomach, according to the modern surgeon. Mr Mayo Robson, however, did not go so far as that. He admitted that we have some use for the stomach, and also that physicians have still some work cut out for them.

But he (the speaker) must confess that Mr Mayo Robson in his very remarkable appeal had shown that there was a great deal more to be done by surgery for the stomach than they had been accustomed to think; and on looking back, he would confess to remembering a good many cases where surgery might have saved a patient, and where the patient had perished for want of what surgery could do now. He remembered one case in which a woman was bleeding to death—he was fully alive to it, and wandered through a whole evening to find a surgeon who was willing to cut down and staunch the bleeding. He failed to get him, and the woman died. They were fortunate as a society in having been able to secure Mr Mayo Robson, and thankful to him for the admirable paper which he had read.

PROFESSOR GREENFIELD did not like to take up the time of the Society when one had not concentrated one's thoughts. He should like to have traversed Mr Mayo Robson's statistics if he had had the courage; but was aware of the extreme care and

caution which Mr Mayo Robson exercised in these matters, and would not do anything of the kind without carefully looking into the subject. Like all his statistics, one felt that these had been compiled with the greatest care; but they did not seem to represent the results of one's own experience, and therefore required very considerable proof. There was not much hope, however, of reducing the large mortality indicated by medical figures, and therefore surgeons would have the larger scope and practice. He thought that physicians ought first to lay their heads together to come to some definite conclusion as to what were diagnostic points of ulcer in the stomach. In the difficult cases they should endeavour to help the surgeons by endeavouring to arrive with precision at the exact locality of the ulcer. The known incidence of ulcer in the stomach should be considered. He would go first to the position where we knew ulcers were most common. As to the cases where one would be thankful for operation—he thought duodenal ulcers came under this head—the risks of recurrence were very great. When situated at the pylorus or within two inches of the pylorus, not only is there risk of stricture, but healing is frequently faulty and the ulcer is liable to recur. If we can diagnose these, we ought to encourage rather than discourage, at anyrate, exploration; and, if possible, operation. The most difficult cases were perhaps those of the chronic ulcers which gave rise to none of the common symptoms. Some of these were where the ulcer was duodenal, or on the posterior wall of the stomach, burrowing deeply above the pancreas and perhaps eroding the splenic artery or vein. In reference to these cases they might ask Mr Mayo Robson whether he has operated upon any cases in which the ulcer had formed a deep funnel-shaped erosion, possibly into the pancreas, as is sometimes the case. It would be an important point to know whether a plastic operation on the wall of the stomach is possible in such cases, and whether it should be attempted at the time of operation. He might say that he thought Mr Mayo Robson had hardly represented what was the usual practice in Edinburgh in the treatment of chronic ulcer. He did not think it was usual to allow these patients to go about—he should be sorry to do so—and he thought that a much more prolonged period of rest than a fortnight should be enforced (Mr Mayo Robson intimated that he had said a fortnight after the cessation of all discomfort and pain). The speaker understood Mr Mayo Robson to infer that these patients were allowed to go about and be treated as out-patients. He might add that he had been very much impressed in some cases of recurrent hæmorrhage with the value of the continuous use of large quantities of iron. He

could recall several cases where the persistent use of large quantities of iron had been followed apparently by perfect cure.

DR JOSEPH BELL divided all medical authorities into two classes—one class whose books one never read, and the other whose books one read all that could be got hold of. Mr Mayo Robson was of the latter class. He entirely agreed with the views he had expressed in this paper. He was sorry to say that during the time he was surgeon to the Royal Infirmary no physician had ever asked him to open an abdomen for hæmatemesis ; and from his own lack of experience in the matter he would not occupy the time of the Society, but merely thank Mr Mayo Robson for his paper, which he had listened to with the greatest possible advantage.

MR CAIRD felt that they owed Mr Mayo Robson a debt of gratitude for the manner in which he had emphasised the early co-operation of physician and surgeon. It was formerly the case that the surgeon was summoned only when the resources of the Pharmacopœia had proved futile, and when, unfortunately, surgical measures were equally futile. The present increasing success and safety associated with surgical intervention gives one the greatest encouragement to interfere in serious conditions before it is yet too late. He would like to have followed Mr Robson into the various questions concerning the operation of gastro-enterostomy, etc., which had been touched upon, but he felt himself bound to adhere to the subject under discussion, that of the treatment of hæmatemesis, due to gastric ulceration.

Mr Robson's statistics as to the frequency of fatal hæmorrhage were very striking, and it would be interesting to learn the individual experience of those present as to the relative frequency of fatal cases occurring in private practice on the one hand, and under the enforced rest and quiet of hospital care on the other. Personally he only knew of a single instance in the Royal Infirmary which terminated fatally in the hands of the physician. He gathered that the physician so frequently saw recovery from impending death in such cases, that he was generally sanguine as to the result of general treatment, and was therefore loath to avail himself of heroic measures of doubtful efficacy.

Mr Robson had divided the severe cases which required surgical aid, firstly, into those where a typical ulcer existed with arterial erosion, giving rise either to a fulminating or to recurrent dangerous hæmorrhage ; and, secondly, into the type where lesions were practically microscopic, or of the nature of post-operative hæmatemesis.

Now ordinary surgical principles suffice for the arrest of hæmorrhage, no matter where, and hence in the fulminating

type there is a clear indication to expose and secure the bleeding point. This is in itself, however, a serious procedure, and under the circumstances when it is demanded, may serve to hasten the end in spite of an after transfusion. Hence it might be asked if no simpler and safer, albeit less certain method, could not be accepted. Mr Caird thought that this could be done by enforcing the conditions of absolute rest so essential in the natural arrest of hæmorrhage. He thought if we looked upon the treatment of vesical hæmorrhage as analogous, and reflected upon the excellent results gained by incision and drainage, how frequently this prolonged life for many months, or again, how it abolished the immediate risk of death from bleeding, and allowed us thereafter to treat, and perhaps remove, the cause, then we might apply the same principles to the gastric organ. Moreover, the stomach is more advantageously situated for such procedures than the bladder, in so far as we can give a greater degree of rest.

He would therefore recommend in such cases of active gastric hæmorrhage the performance of a gastrostomy to give rest and drainage, and I would select the operation of Witzel or some of its modifications as being speedy, safe and readily performed with local anæsthesia if need be. This would permit one to empty the stomach, to drain off the continuous gastric secretion, and to recognise any fresh bleeding. The stomach thus kept empty vomiting would cease, rectal alimentation would be maintained, and should fresh hæmorrhage ensue, it could be checked by the use of hot saline lavage.

He would specially recommend this plan in the second series of cases for which Mr Robson had not suggested special treatment, and also in recurrent or even in fulminating cases where the condition was critical. He had only one single experience of the method, unfortunately not successful. By the courtesy of a colleague it was carried out in a case where a fatal issue was impending and followed twelve hours after operation. At the autopsy an hour-glass contraction was disclosed with the tube projecting slightly into the smaller pyloric sac. The larger cardiac sac had thus remained undrained. The patient had in consequence vomited and this determined a slight fresh bleeding, which was probably aided by the strenuous use of transfusion and stimulants thought necessary.

The lesson learned was that in all cases the tube should be introduced for several inches as far as the lowest point of the fundus, the organ then should be washed out and Cathcart's continuous syphonage established. By such means we may obviate the disagreeable necessity of employing the stomach tube, which is so often badly borne by patients, but which is so indispensable in bringing many cases to a successful termina-

tion—gastro-enterostomies even not excepted. At a later date we may utilise the gastrostomy wound for an examination of the interior with the cystoscope. As is well known the gastric fistula after Witzel's operation shortly heals on withdrawal of the tube. The method possesses further the merit that no special or great surgical skill is required for its application.

MR M'GILLIVRAY wished to emphasise the pleasure and benefit he had derived from Mr Mayo Robson's paper. Personally he had had considerable experience in the treatment of hæmorrhage, and he saw many cases recover without operation. He confessed that he did not see how the method proposed by Mr Caird was to have very much benefit on the hæmorrhage. The analogy with the urinary bladder did not seem to hold, as there was the urine always coming in in the latter case that had to be disposed of, and he did not see how a gastrostomy was to give the absolute rest desired. He thought an equal amount of rest might be given by withholding all food.

MR WALLACE had not intended making any remarks, and had only risen because he thought there were two particulars in which the paper was to some extent open to criticism. In the first place hæmatemesis was to his mind only one symptom in connection with affections of the stomach to which it was important that their attention should at the present time be called. They were aware that in recent years various authorities had directed special attention to ulcer of the stomach. Now, bleeding was only one symptom in relation to ulcer, and acute bleeding was, he thought, a rare condition. Excluding carcinoma, he thought great hæmorrhage from ulcer was not common. He had seen a fair amount of bleeding in many cases, but not many where the physicians, alert as they were now to call in surgical treatment, would consider the hæmorrhage so great as to render this step a necessity.

Then again, there were cases where the hæmorrhage was so great that the patient was very rapidly brought to a condition of *in extremis*. He did not know whether the case referred to by Mr Caird in the students' ward was one which he had seen on several occasions, but he could recall recommending that the stomach should be opened and the stomach and duodenum explored and the vessel ligatured. But this happened several years ago, and the suggestion was not entertained.

He would like to ask Mr Mayo Robson two questions. The first was, whether he was in favour of operation upon a gastric ulcer which was chronic, which had resisted all treatment on the part of the physician for a certain length of time, where the

symptoms were not markedly improving and where the patient was running a certain amount of risk of the double condition of perforation and hæmorrhage? Because, although hæmatemesis was an important symptom, it was questionable whether any chronic ulcer of the stomach should be treated medically for a length of time without surgical interference. He was not prepared to enter into the statistics question, but most of them were aware that statistics had been brought forward by one or two, particularly by one of Mickulicz's assistants, in which it was definitely shown that the mortality from gastric ulcer treated solely by the physician was so high as to indicate the necessity for surgical interference; and Mickulicz further points out that the mortality in his own clinique after operation is less than where patients were simply treated by the physician. His second question to Mr Mayo Robson was, what was the percentage of hæmoglobin and what the number of red blood corpuscles in a case that he would consider to be beyond remedial measures? In other words, did he in his operative procedures on gastric cases lay any stress on the blood condition? He thought it was a point of some importance, as it was known, in relation to abdominal surgery in particular, there was great risk of operation because of a marked anæmic condition. The lips might be red and the pulse good, yet these patients might die under operation, without any sepsis or other apparent cause.

DR JAMES felt a certain amount of diffidence in speaking on the question of hæmatemesis, because he was one of those physicians who had never yet had a case in which he considered it necessary to call in the aid of the surgeon. He had looked up some statistics and had got the records of some fifty cases of gastric ulcer which had been under his charge. In these there were 46 with hæmatemesis at one time or another. Of these 46 several were recurring and very copious. In one case the red blood corpuscles were reduced to some 450,000, and the hæmoglobin to six per cent. But the case recovered. He was delighted to hear what Mr Mayo Robson said as regards treatment; and under the treatment which had been adopted in the cases to which he referred, he had not had a single death in these 50 cases. He would not like for a moment to say that there are no cases in which surgical aid should be called: a case of this sort might arise at any time; and he would say further that he was thoroughly at one with the surgeons in the need for operation where you have a chronic ulcer leading to constriction, or where, as a result of adhesions to surrounding viscera, there was a history of dyspepsia for

years. He was then strongly in favour of exploration, and whatever was found necessary in the way of operation.

DR BRAMWELL would mention, firstly, that they were dealing with a subject where all of them were to some extent perhaps taken by surprise. He supposed that they had not been in the habit of thinking very much of the surgical treatment of gastric ulcer, and were very much in the position they were when the surgeons commenced to operate upon the brain. Perhaps their minds were rather predisposed against surgical interference. He was, with Professor Greenfield, much struck with the statistics which Mr Mayo Robson had brought before them, and he hardly thought that modern statistics would at all bear out the conclusions come to. The medical treatment of gastric ulcer had undergone a very marked alteration that had fortunately now made them more successful than when these statistics were published. He referred more particularly to rectal feeding and giving the stomach a complete rest. He was entirely with Mr Mayo Robson in thinking that long rest of the stomach was one of the most important points, but the question then before them was, if they had a case of hæmorrhage from the stomach, was it to be treated by the surgeon or not? In answer to that question, he thought Mr Caird, Dr James, and Dr Affleck had mentioned facts which were of great importance—that the majority of these cases, however severe, got better in the hands of the physician. His own experience was the same as Dr James'. He had never, so far as he remembered at present, seen a fatal case of hæmorrhage from a simple gastric ulcer. He had seen many patients at the point of death, and considered the question of transfusion, but the cases had all ultimately got well. He could not agree with Mr Wallace that copious hæmorrhage from the stomach was an uncommon thing in gastric ulcer. He thought Mr Mayo Robson had answered the question very fairly when he said, let the physician have a fair chance. He would say also, give the patient a much more prolonged period of rest than has hitherto been done; and then in a small proportion of cases perhaps the surgeon may have to operate. The difficulty was to decide in which cases operation was necessary. He thought it was chiefly in the cases of chronic ulcer with recurrent hæmorrhage that the surgeon should be called in, and they should also remember that all surgeons had not had the experience of Mr Mayo Robson.

MR MAYO ROBSON, in reply, wished that time would permit of his answering all the points that had been brought forward. The discussion had been an extremely interesting one. He

thought it had brought out that they practically agreed that some cases should be dealt with by surgical treatment. Most of the speakers argued, and he thought it was quite clear, that the chronic bleeding ulcers could be thus relieved—these, he had no hesitation in saying, could be relieved by a gastro-enterostomy, for instance, which would put the stomach at rest. He was rather astonished to hear Dr Bramwell and others question the statistics which he had quoted. He was not quoting from his own experience. Take Rodman, who had written as lately as 1900, and whose cases are most carefully analysed. He shows 8 per cent. of deaths from hæmorrhage in gastric ulcer. Then Dreschfield, who is a physician pure and simple, and has no special interest in surgery, made the percentage 3½ per cent.; Lebert gives 3 per cent. of deaths, and Steiner gives 6·36 per cent.; Brinton, 5 per cent.; Müller, 11 per cent.; and Welsh, an experienced physician, gives 3·5 per cent. He thought that these authorities were reliable, and that the analyses extended over a very large number of cases, whatever any individual surgeon or physician might say. He did not think they could put these figures aside and say that no deaths do occur, as some physicians would who had spoken. He was not arguing from the experience of one, but of many authorities. He had taken the mean percentage of deaths at from 5 to 7 per cent. Of these, from 2½ per cent. to 3 per cent. resulted from acute hæmorrhage, and the other 3 per cent. from chronic hæmorrhage. Now, this 3 per cent. of deaths from recurring hæmorrhage could be saved. Of those due to acute hæmorrhage, he did not say these could be saved. Some of these will die whether treated by physician or surgeon; but what he thought was that an attempt should be made to save some of these cases. He was extremely interested in Dr James' statistics. They showed that of [illegible] cases of ulcer forty-six had hæmorrhage. [illegible] He the speaker had put down the [illegible] with hæmorrhage at 50 per cent. to 80 per [illegible] over 90 per cent., and [illegible] It was most [illegible] That surely [illegible] In any event it is very interest- [illegible] to help one to a [illegible] had been [illegible] to the amount of [illegible] answer that; [illegible] He had, [illegible] as valid as the [illegible] had recovered. He [illegible] a theoretical than a

practical matter in acute cases. He was extremely interested in Mr Caird's observations in regard to drainage. He did think there was something in the comparison, although Mr M'Gillivray thought there was not. He thought that a gastro-enterostomy does have the same effect as putting a tube in the bladder; it drains away the contents of the stomach, stops the vermicular movements, prevents hyper-acidity, and gives rest. In that way they got the result of morphia administered medically—absolute physiological rest. With regard to Professor Greenfield's question, he had operated on several cases in which a large ulcer, as big as half the palm of one's hand, had eaten through the posterior wall into the pancreas. It was quite hopeless to excise such an ulcer in two of these cases, and a gastro-enterostomy had proved absolutely curative. These two cases were middle-aged men, and are now in perfect health. Just one other remark. He knew that cases of gastric ulcer were treated properly while under medical charge. But, as a matter of fact, cases of chronic ulcer did go about; he was seeing them frequently—they went about month after month, and year after year—some had been operated on after a duration of twenty-five years. He wished he could answer all the questions put, but unfortunately trains would not wait. He had been very glad to hear Sir William Gairdner's concession to the treatment he had advocated. He hoped it would be seen that he did not propose that surgeons should take over all these cases; he wanted to be quite clear that surgeons should take over no cases apart from the physician. All these cases should have medical treatment first, and then surgical treatment should follow. He thanked them all for their very kind reception.

A CASE OF ACUTE CELLULITIS TREATED BY ANTISTREPTOCOCCIC SERUM

Read before the Aberdeen Medico-Chirurgical Society

By FRANCIS KELLY, M.D., Aberdeen

I BRING the notes of this case before the members of the Society, not because it possesses any special features, but that it may form a basis on which to found a discussion as to the merits or demerits of antistreptococcic serum.

It is unnecessary to speak of the preparation of the serum, but I would remind you that it was first demonstrated in this country to the British Medical Association at the summer meeting of 1895 by Professor Ruffer, as a rational and pos-

sible method of treatment of those septic conditions induced by streptococci. Bokenham started a discussion in the medical papers in September of that year, which still further brought the matter before the notice of the medical profession, and very soon reports began to be published as to its use, with free praise and as free condemnation. So indiscriminately was it at first used that a warning note was elicited in 1896 from Bulloch, pointing out that this serum was manufactured as a weapon to be used against streptococci, and that it was foolishness to expect it to give good results in septic cases due to staphylococci, gonococci and other germs. Bulloch rightly insisted that every case ought to be bacteriologically examined as a necessary preliminary. This warning had a good effect in many cases, the result of the bacteriological examination being noted in the published accounts of cases; but the literature of the subject even yet abounds in cases where approbation or condemnation is bestowed, and where there is no hint that any preliminary examination was made, and even when the examination has been made—I read a long report in the *British Medical Journal* in September 1899, where splendid results followed the use of the serum in an obstinate case of otitis, and where the recorder adds: "The bacteriological examination revealed that there were no streptococci present, but a large number of staphylococci."

But I infer from Bulloch's letter that at that time (1896) it had not occurred to the bacteriologists that there might be a difficulty in the treatment which was brought out by Dr Washbourn at the Harveian Society in the latter end of last year, when he attributed otherwise unaccountable failures to the fact that different varieties of streptococci producing corresponding varieties of toxins require corresponding varieties of antitoxins.

In the various reports I have come across, most are records of single cases or of small numbers occurring in the practices of individual investigators. But two records are outstanding and are worthy of more than passing notice. The American Gynæcological Society appointed a "Committee on antistreptococcic serum in puerperal sepsis," which gave in a report published in June 1899, reviewing all the work done in the matter up to April 1st of last year. They analysed and tabu-

lated 354 cases from France (214), Germany (15), Great Britain and America (125). The death rate was reported to be 20·6 per cent.; but this the committee pointed out was probably unreliable, as the reported cases were nearly always severe, and there was possibly lack of bacteriological confirmation. The members of the committee had used the serum in forty-five cases, all of which were verified by bacteriological examinations, with three deaths, giving a percentage of 6·6. In all cases local treatment was stopped after verification of the presence of streptococcus. The committee reported that the death rate from streptococcus-endometritis, if not interfered with, was 5 per cent. Among the conclusions of the committee was one that Marmock's claim that the serum was an absolute cure was not verified, and this report is now usually claimed as inimical to the serum.

The discussion at the Harveian Society before alluded to was another interesting contribution to our knowledge of the subject. Here Dr J. W. Washbourn gave general approval of the value of the serum. It was agreed that the best dose was from 10 to 30 c.cm. administered once, twice or three times a day, according to the severity of the case; also that the injection should be as near as possible to the infected area. The best practical hint to be gathered from the discussion was the fact that where the serum of one manufacture was a failure often that of another was successful. Dr Washbourn attributed this not to any defect in the manufacture, but to the causation of septicæmia by different varieties of streptococcus. This view was coincided in by Dr Dean.

Of the other published cases the majority are those of puerperal septicæmia. In this country the serum was at first cautiously employed in this class of case, but from the reported discussions of the various gynæcological societies it seems now to be in more favour, and the worst that is said of it is that it can do no harm.

For a time it was tried in infectious diseases, but its use in scarlatina was abandoned in the metropolitan fever hospitals last year.

Dr W. J. Lindsay in May 1899 published a lengthy report on his use of the serum in six selected cases of smallpox. He says that all were at the confluent stage and that there

was small hope of a successful issue in any. Three dozes of 10 c.cm. were given in each case at intervals of twenty-four hours. Four recovered, two died. No local pain, local abscess, arthritis or hyperpyrexia ensued in any of the cases. One is tempted to wonder whether the two might have been saved by larger doses more frequently given.

Lastly I should like to remind you of two cases published by Dr Mitchell Bruce last year.

The first was a case of septic endocarditis which had been under observation and treatment for twelve days, the temperature ranging between 102° and 103·5°. As a last resource, while the temperature was 104·8° and the patient's strength was rapidly sinking, an injection (10 c.cm.) was given and repeated in twelve hours; the temperature became normal and remained so, and the strength rapidly returned.

The second case was more interesting. It was one of septicæmia of a cerebro-spinal type. On the thirty-ninth and fortieth days of the disease, 10 c.cm were administered without avail; other treatment which had been intermitted was again tried, but the patient was losing strength, and Dr Bruce thought of trying serum of a different manufacture from the first; this was given on the forty-eighth day and was followed by five other injections, with good results, the temperature never again rising above 100° and the patient rapidly recovering.

Even under the most stringent antiseptic precautions various annoying sequelæ have been from time to time recorded. Happy is the man who can say as some do, "The patient recovered without any bad after-effects." In many of the records, I find accounts of disturbance to the recovery from sequelæ which apparently cannot be prevented.

Several record the appearance of pustules not only in the line of insertion, but in distant parts of the body, frequently with rise of temperature, but I have seldom seen recorded any bacteriological examination of the contents of these pustules. Desquamation general or local, local pain persisting for some time and general pains are recorded. But the most common and probably most annoying is the occurrence of skin eruptions, most frequently urticaria, not a transient affair, but unyielding to treatment for forty-eight hours or longer.

Having given a rapid and imperfect review of such

literature on the subject as I have been fortunate to come across, I should like to briefly lay before you the leading points of a case of acute cellulitis which recently came under my observation.

The patient, a strong man of twenty-eight, first came under my notice on October 25th. He complained of intense pain and swelling in the back of the right hand. It was elicited that he had received some days previously a superficial wound in the web between the fore and middle fingers of that hand, that a small abscess had formed, and that he had squeezed this abscess severely trying to evacuate it. Soon after this performance the hand began to swell, and an hour later there was intense persistent pain. There was a fair amount of swelling on the dorsum of the right hand, localised to the radial side, so that I thought an abscess was developing there. The temperature was over 103°. The pain was controlled by narcotics, and hot antiseptic dressings were applied locally, and the patient attended to business. Next day he stayed in bed, the temperature being 103·6°, while the pain persisted and the swelling was more general over the hand, involving the fingers. An incision was made, including the original abscess-opening, along the back of the hand, and much serous fluid but practically no pus was voided. This resulted in some improvement, but next day the swelling had extended to the ulnar side of the hand and the wrist. A second incision was made over the fourth metacarpal, and again much serous fluid was exuded with temporary relief. During this day, however, and the next, the swelling rapidly extended up the arm, and the temperature touched 104°. The glands—cubital and axillary—were never involved, nor were the lymphatic vessels discoloured. The swelling was fairly uniform from the distal end of the first phalanges to the elbow, mainly on the extensor aspect, bright red over the wrist and everywhere brawny, the whole limb being twice its ordinary circumference. The friends by the evening of that day (October 28th) were persuaded, as the swelling had extended half-way up the arm, and the patient was more or less delirious, to allow more extensive treatment, and I obtained Dr Gray's help.

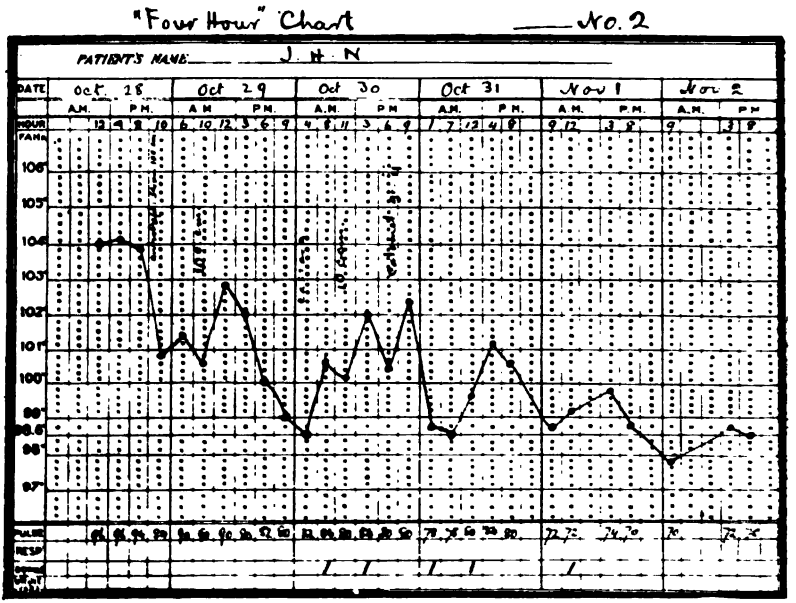
Under chloroform, the arms and hand were freely incised and drained, and dressed with aseptic gauze.

The sero-purulent discharge from the wound was examined microscopically and found to contain streptococci.

Under strict antiseptic precautions, 10 c.cm. of antistreptococcic serum of the Jenner Institute were hypodermically injected in the left side of the abdominal wall, at 11 P.M., immediately after the operation.

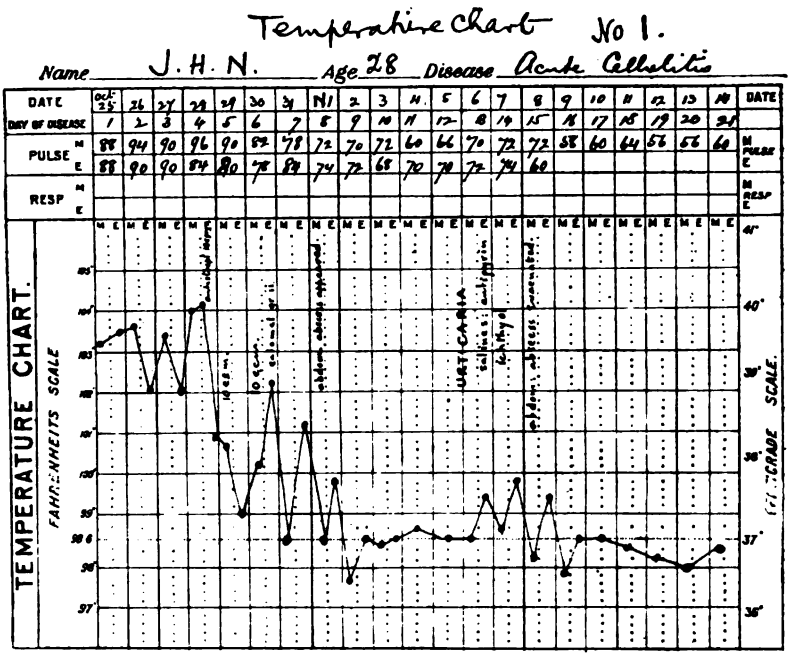
Subsequent to the operation, the patient became more delirious, and remained delirious for thirty-six hours.

Next day (October 28th), at 10 A.M., the temperature was 100·6°, so a second dose of serum (10 c.cm.) was injected in



the right side of the abdomen. The dressings were removed and the arm was soaked for two hours in a warm solution of boric acid. The swelling was much reduced, there was free discharge of thin, fœtid, sero-purulent fluid, and the pain was greatly lessened. At mid-day the temperature was 102·8°, but it steadily fell from then until 9 P.M., when it stood at 99°, while it was 98·6° on the 30th. Through the forenoon it rose to over 100°, and a third injection of 10 c.cm. was given in the left epigastric region, again followed by a rise of temperature to 102°, followed by a fall in the night to normal (see temperature chart No. 2). The arm was again soaked in warm boric

solution for two hours in the morning and for an hour at night, which treatment was continued for twelve days. On the 31st, the temperature rose to 101° in the evening, but as the patient was comfortable and free from pain, and the arm was rapidly recovering its normal size, no further injection was given. Next day, a possible cause of this rise was discovered in a flat swelling in the left hypogastrium, exactly corresponding to the swelling made by the first injection and an inch and a half



from the puncture. The temperature on November 1st was 98·8° to 99·8°, and it never again rose above 99°, except on one occasion to be hereafter noted. On this and the following three days the drainage tubes were removed, and the edges of the wounds approximated by catgut sutures, they having become quite free from any appearance of pus.

The patient rapidly recovered, and was allowed to go into the open air on the 4th.

On the night of the 5th to 6th of November, he was attacked by a severe general urticaria, and at the same time

the swelling in the abdominal wall was noticed to be more pronounced and distinctly fluctuating. The possible causes for the eruption which occurred to me were: (1) any indiscretion in diet; (2) boric acid absorbed from the bath; (3) the serum.

There was nothing in the diet that could be blamed, and it was six and a half days since the last injection of antistreptococcic serum. The use of boric acid in the bath was at once stopped without effect. After the disappearance of the rash, boric acid was again used without giving rise to any trouble. Salines, antipyrin, and ichthyol were in turn exhibited without relief, the temperature meanwhile rising to 99·8°, and sleep being almost absent. On the morning of the 8th an incision was made in the left hypogastrium over the swelling, and a large amount of pus evacuated, the abscess drained, and almost immediate relief from the pain of the urticaria experienced. In a few hours the rash had disappeared, and the temperature had returned to the normal or sub-normal range (see temperature chart No. 1).

The abdominal drainage tube was removed on the third day and the wound healed readily. The pus obtained by this evacuation was examined microscopically and found to be teeming with streptococci, and a typical culture was obtained by Dr Duncan, Aberdeen University Pathological Laboratory.

Meanwhile, the wounds of the arm and hand were healing rapidly, and the patient got outside on the 11th, had carriage exercise on the 13th, foot exercise on the 14th, and returned to business on the 19th, twenty-two days after the first injection of serum.

I regret that I did not think of examining the blood microscopically before or immediately after the injection of serum.

In considering the case, there is no doubt in my mind that the rapid improvement was not entirely due to the other methods employed apart from the use of antistreptococcic serum. A point of interest is the development of the abscess at the site of the first injection, which was non-inflammatory, three cardinal symptoms—dolor, calor and rubor—being absent. Nevertheless the pus from this cold abscess was teeming with

living streptococci, no such phenomena being present at the site of the two other injections. The failure of the streptococci to produce inflammatory symptoms is thought by Dr Gray and myself to be due to the fact that streptococci were probably floating in the blood stream, that they seized upon the tissues whose vitality was lowered by the injection of the serum, and developed there, the serum being absorbed into the blood stream and inhibiting their virulence; that no abscess formed at the site of the second or third injection because the serum of the first injection had already sterilized—shall I say?—the blood. Marmock, who discussed this point, enunciates this among other possible causes. I may mention that these abscesses have been attributed to the presence of micro-organisms other than streptococci in the serum. This does not seem to have been the case here. The occurrence of a rash so long after the injections was very interesting, and I can account for it by no other reason than that it was due to the serum, and it has been noted in other cases where no abscesses have developed. Its syncronicity with the ripening of the abdominal abscess and its disappearance on the evacuation of the latter, I do not attempt to explain. I am prepared, however, to use the serum and to urge its use in any suitable case and risk the inconveniences attending or following its use, for one must weigh impairment of function or actual loss of limb or even life against the chances of cure by treatment without the serum.

In the case just recorded, the man has almost completely recovered the use of his hand and arm and is daily improving; whereas from observation of cases apparently similar in every respect, the cases have lasted over periods ranging from six weeks to six months or more, complicated by sloughing skin, aponeuroses, tendons and vessels and necroses of bones, with the consequent more or less severe curtailment of function or even the more disastrous results alluded to—loss of limb or of life.

A PLEA FOR THE MORE GENERAL USE OF ETHER AS AN ANÆSTHETIC IN GENERAL SURGERY

By THOMAS D. LUKE, M.B.,

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LET it be granted that a major operation is about to be performed, and ask any member of the medical profession—north of the Tweed—be he hospital surgeon or country practitioner, what he would use to produce anæsthesia, and it is by no means putting it too strongly to say that ninety-five out of one hundred would reply —"Chloroform!"

That this is so, is due largely to use and wont, and not to any known inferiority in ether as a producer of anæsthesia. It is due to the fact that in all the large Scottish schools, students see chloroform given as a matter of routine. They are taught to give it, and later they administer it more or less indiscriminately in their practices. The fact, however, that the use of ether is not taught and its great advantages in many cases are not demonstrated, is a lamentable one.

No one can have two opinions as to the extreme value, and indeed indispensableness of chloroform as an anæsthetic—but even its warmest partisans will admit its defects—and the object of this article is to point out the drawbacks to its indiscriminate exhibition, to state the case for ether, and to indicate the advantages of its employment in many surgical operations.

Surgical science has advanced with such rapid strides during the past quarter of a century—antiseptic and aseptic methods have rendered surgical procedures to such a degree of mathematical precision that the risk attendant on all operations has been greatly reduced, that is of the operation *per se*, and the [illegible] as it seemed in the days when [illegible] pyæmia were [illegible]—has grown in importance.

[illegible] what he dreads [illegible]—"The stertor."

[illegible] of ether and chloro- [illegible] the Physiological Labora- [illegible] M'William

and others—and also abundant clinical evidence to weigh down the balance in favour of ether. The conclusion of the late Professor Coates, as far as laboratory results are concerned, was that "he was firmly convinced from multiplied experiments, that ether exercises much less of a paralysing action on the intrinsic ganglia of the heart than chloroform does," and "that, as far as laboratory experiments were concerned, ether came out distinctly better than chloroform."

It is found that death during the administration of chloroform is due in the large majority of cases to cardiac syncope, which may arise from—

1. Reflex stimulation of the vagus, causing inhibition of the cardiac pulsations; this occurs in light anæsthesia, due to insufficient chloroform.

2. Depressant action of the chloroform in the medullary centre of the heart, the vaso-motor centre, the intrinsic ganglia, and on the myocardium itself.

Death in this manner is due to overdose—of course, overdose is purely a relative term—in regard to which the personal equation must bulk very largely.

While death is most commonly due to failure of circulation, it may be due to cessation of respiration occurring in three separate ways—

1. Direct obstruction from
   - (*a*) Laryngeal stertor, due to spasm and approximation of aryepiglottidean folds.
   - (*b*) Falling back of the tongue.

2. Direct retardation and arrest of the pulmonary circulation—first in the capillaries and later in the larger vessels—due to the direct local action of chloroform.

3. Interference with the respiratory centre in the medulla and the subordinate centres in the spinal cord.

With reference to the last, we must bear in mind that in chloroform we have a drug which acts by temporarily paralysing the nerve centres.

The higher centres it is our object and desire to paralyse, but we only have to go a step further to produce a similar effect on those governing the vital processes.

We thus observe that chloroform kills in two distinct ways by its action—(1) on the circulation and (2) on the respiration.

Probably these actions are frequently continued and occur simultaneously. There has been much useless controversy on the subject.

Examining the manner by which a fatal issue is arrived at with ether, we find the possibilities, and consequently the likelihood, of a fatal issue much less numerous.

Death may arise from cessation of respiration due to—

1. Direct obstruction from laryngeal spasm, falling back of tongue, etc.

2. Spasmodic contraction of respiratory muscles, arising, as a general rule, from *overdose*—a very unlikely event if reasonable care be exercised, the patient watched and cyanosis avoided.

The *modus operandi*, as in the case of chloroform, is the paralysis of the respiratory centres, due to overloading of the blood with ether; and there is, as a general rule, ample time for the avoidance of a fatal issue by the use of artificial respiration.

With chloroform, however, when the blood is so saturated as to cause paralysis of the respiratory centres, the circulatory centres will be very seriously interfered with, if not already paralysed, and satisfactory result from the application of restorative measures is less likely on this account.

Syncope during the administration of ether is almost unknown. The drug is itself a cardiac stimulant, and if heart failure does occur it is due to some constitutional dyscrasia, or to lowered vitality.

We would naturally expect, from the respective actions of chloroform and ether, as briefly stated above, that fatalities would be more frequent among the administration of chloroform, and our expectations are amply justified by clinical results.

Out of 109 fatalities from chloroform administration, collected by the Royal Medico-Chirurgical Society, the direct causes of death were as follows—

56 were due to syncope.
6 „ „ during the stage of excitement.
6 died suddenly (? syncope).
9 died from simultaneous cessation of pulse and respiration.
10 died in a fit (? syncope).
8 died from respiratory arrest.
14 „ causes unstated.

109

We see that practically 73 per cent. of the above were due to cardiac syncope.

In Snow's list of fatalities, in which 50 were included, death was in each case due to cardiac syncope. The *Lancet* Commission reported on 700 cases (50 of which were dental extractions) and in all of these death was due to cardiac syncope. It is thus apparent that the majority of chloroform fatalities are caused by heart failure.

During the administration of ether we only need fear syncope from causes arising apart from the anæsthetic—in connection with the operation; as far as the ether goes we are practically only concerned with interference with the respiration.

Twenty-seven deaths during ether administration, which were reported in the *Lancet* and *British Medical Journal*, during ten years, occurred during operations on patients affected as follows: empyema (2), pleurisy and dilated heart (1), bronchitis and emphysema (1), thyroid tumour, diphtheria, laryngeal cancer, pleural adhesions, œdema of lungs (all conditions impeding respiration), intestinal obstruction, deep asthenia, abdominal growths in very asthenic patients, advanced morbus cordis and asthenia, thoracic sarcoma.

The remainder were suffering from cardiac or renal disease in an advanced stage, while one died from vomited matter in respiratory passages.

Dr Ormsby of Dublin, who carefully investigated the question of mortality, published the following figures [1]:—

Anæsthetic.	Administrations.	Deaths.	Rates.
Chloroform	152,260	53	1-2873
Ether	92,815	4	1-23,204

Dr Juillard of Geneva, who similarly investigated on the Continent, found as follows [2]:—

Anæsthetic.	Administrations.	Deaths.	Rates.
Chloroform	524,507	161	1-3258
Ether	314,738	21	1-14,987

I am, however, in possession of the most recent and reliable statistics, through the kindness of one of the anæsthetists to

[1] *Brit. Med. Journ.*, April 14, 1877.
[2] *Rev. Medic. de la Suisse Romande*, No. 2, Fev. 1891.

St Bartholomew's Hospital, where every anæsthetic administered since 1877 has been carefully recorded with full particulars.

The following is a statement of the administrations of ether and chloroform during this period :—

Anæsthetic.	Administrations.	Deaths.	Rates.
Chloroform	37,914	29	1-1331
Ether	32,674	3	1-11,262

Thus it is demonstrated that at this hospital *the deaths from chloroform are just nine times as numerous as those from ether*, while the rates of the respective administrations is as 112 to 100. It is necessary to bear in mind that the skill used in these cases must be considerably above that of the average administrator.

The anæsthetics are all given by two visiting or two resident anæsthetists of very great experience, or by post-graduate pupils, or very senior students under their immediate supervision. Making due allowance for statistics, in regard to which chloroform enthusiasts are wont to agree with Jabez Balfour, the figures are too startling to be overlooked.

We all know the child-like trust which patients repose in their doctor, and the enormous faith they have in the surgeon's skill, and belief that both will do their very utmost for him in his affliction. If any factor tending to his safety is neglected —if the surgeon or medical attendant allow themselves to be blinded by prejudice and blink at facts like the above—does it not amount to a breach of trust, and do they not take upon themselves a very heavy responsibility?

Chloroform enthusiasts are wont to say that ether is a slow method of producing anæsthesia—that it is unpleasant—followed by severe sickness, or bronchitis—is dangerously inflammable, bulky to carry, and what not?

The majority of these objections are due to ignorance of the use of ether and to prejudice.

1. Ether given as it should be, preceded by the administration of a small amount of nitrous oxide, is not slow: it is more rapid than chloroform, the patient being fit for operation in three to three and a half minutes on an average, and given in the same manner it is by no means unpleasant, as from personal experience I can testify.

2. Bronchitis—the pet bugbear—is largely a relic of former days and imperfect methods. Ether, from the time of its introduction by Morton in 1842 up to 1877, when Clover brought out his portable inhaler, was given generally on a towel by the open method.

The cloth was laid across the patient's face and drenched with ether, almost suffocating him with the pungent vapour, and making him cough and gasp until he finally went "under"; and then the saturating process was kept up, the patient breathing an Arctic atmosphere, rendered so in the vicinity of his mouth, etc., by the rapid evaporation of the anæsthetic; and that bronchitis was not more common is to be wondered at.

If ether be given by a Clover's or Ormsby's inhaler, judiciously and skilfully, bronchitis is almost unknown as an after-effect, and is really a negligible factor, and this is the consensus of opinion of those who have most experience of ether.

Mr Pridgin Teale, of Leeds, who, for many years prior to his adoption of ether as a routine anæsthetic, used chloroform, says: "During twenty years' experience of ether I have met only one case of bronchitis following its administration."

3. Ether is certainly inflammable, but except where the actual cautery is being used near the inhaler this can be no real objection.

4. Ether is more difficult to administer, but at the same time it is well to remember that *it is more difficult to poison the patient with it.* A child can drop chloroform on to a cloth as long as its fancy may direct, but I venture to say that a person of average intelligence can handle a Clover's inhaler fairly satisfactorily after half-a-dozen lessons, or indeed less, and be in a position to give ether with greater safety as regards the public than after a similar experience in the use of chloroform.

5. "The after-sickness of ether is more severe than that of chloroform." Those who assert this can only do so from profound ignorance of the effect of ether and inexperience in its employment. The statement is very misleading. From my own experience of ether and chloroform I am prepared to state most emphatically that severe sickness is much less common after ether than chloroform.

If vomiting occur, it is usually almost immediately on the withdrawal of the anæsthetic, when the patient is being carried back to bed. Sickness and retching occur in about 50 per cent. in this manner, and in the large majority of cases pass off before consciousness is regained.

Ether sickness is due to mucus impregnated with ether being swallowed during the administration and accumulating in the stomach, and as soon as the reflexes return the stomach rebels against its irritating incubus and rejects it, and the vomiting brings about its own cure.

In chloroform cases, on the other hand, about 35 per cent. are troubled with vomiting, not of a transient nature, but often of a severe and exhausting kind, persisting in some cases for two or three days, and often associated with great pallor and pulse failure—a condition we do not see after ether. Snow even recorded a death from severe vomiting following on chloroform administration.

Granting that in some cases we may be troubled by excessive secretion of saliva—that the stimulation of the circulation may cause an undesirable increase of hæmorrhage, as in the removal of adenoids—that in other cases the respiratory movements may be more vigorous than the surgeon may desire—*e.g.* in operations on the gall-bladder and intestinal anastomoses; granted, also, that certain chest affections complicating surgical disease may be aggravated by its use—in what operations is ether to be considered a good, and further, a desirable substitute for chloroform?

(*a*) In operations on the extremities—such as amputations, excision of joints, osteotomy, and especially in the reduction of dislocations.

(*b*) Operations on the genito-urinary organs—*e.g.* lithotomy, urethrotomy, castration, amputation of the penis, nephrotomy, and nephrectomy.

(*c*) Operations on the rectum, for piles, fistula, stricture, and [illegible] of rectum.

(*d*) [illegible] herniotomies and coliotomy (or colostomy).

(*e*) [illegible] of the breast—partial or complete—and in [illegible] of the cervix, complete vaginal [illegible]

(*f*) In all conditions of collapse—*e.g.* after railway smashes, gunshot wounds, strangulated herniæ and ruptured viscera, or where patient's vitality is extremely low from cachexia, debauchery or chronic inanition.

In these conditions, if properly administered, ether is always *ceteris paribus*, the best and safest anæsthetic.

(*g*) In all dental extractions, where nitrous oxide is insufficient or unsuitable, ether is unquestionably superior to chloroform. The available anæsthesia from one administration is always larger, and, indeed, depends largely on the will of the administrator, who, by "charging up" the patient with the anæsthetic, more or less, can produce a corresponding length of anæsthesia.

Moreover, when the patient is only partially unconscious, teeth may be safely extracted without risk of untoward result from the peripheral stimulus of the operation being reflected on to the vagus. It must be always borne in mind that dental extractions are largely operations of convenience—not of necessity—yet this being so an extraction which, performed under ether, would have had no more risk than a ride on a tramcar, has often terminated in a ghastly catastrophe.

A paper recently published by Mr William Guy on this subject gives abundant evidence of the satisfactory results obtained from the use of gas and ether in dental surgery.

Details of the operations where other anæsthetics than chloroform and ether administered alone, such as A.C.E. (alcohol, chloroform and ether)—C.E.—ethyl bromide, etc., are preferable; and these operations in which local anæsthesia is sufficient and desirable, are beyond the purpose of this article.

I think I cannot conclude better than by refreshing the reader's memory with a summary of the deductions from the *Lancet* and Hyderabad Commission's Report—drawing especial attention to deduction No. 2.

The conclusion of the Commission, in brief, was as follows:—

(1) That the mortality from anæsthetics had been unduly high and by improved methods and greater care the death rate could be lowered.

(2) That *ether*, when properly administered *from an inhaler* permitting graduation of the strength of the vapour, is the safest anæsthetic for general surgery in temperate climates.

(3) That nitrous oxide gas for minor surgery and dental operations should replace chloroform.

(4) That chloroform when given by a carefully trained person is a comparatively safe body, but in no case devoid of risk.

(5) That no age or nationality removes the danger under anæsthetics.

(6) That the perils of anæsthetics, however slight, demand that the undivided attention of a duly qualified and trained medical man should be given to the administration of the anæsthetic.

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Recent Literature

CRITICAL SUMMARIES AND ABSTRACTS

MEDICINE

ACUTE DYSENTERY, ITS ÆTIOLOGY AND PATHOLOGY

By FRANCIS D. BOYD, M.D., F.R.C.P.Ed.,
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SINCE the days of Ebers, Herodotus, Hippocrates, and the other fathers of medicine, much has been written and much work has been done on dysentery, but we are still far from even an exact definition of the types of the disease, far less an accurate knowledge of its pathology and bacteriology. At the present moment the subject assumes an increased importance. With the army in South Africa dysentery daily claims its victims and adds to the casualty roll. To those whose practice lies in tropical and sub-tropical climates, the subject must always be of interest, and when one realised the death-roll that it yearly claims (thus in Japan alone in 1893, of 167,305 cases, 41,282 proved fatal), its

importance cannot be minimised. The most recent study of the subject has been made by Flexner,[1] in the dysentery occurring in the Philippine Islands. The author begins his paper with an elaborate account of the literature of the subject and the many efforts by different observers to isolate a specific micro-organism or protozoa as a causal factor. While epidemic, endemic, and sporadic dysentery have been subjected to bacteriological investigation, the chief work has been done on the tropical variety. Although the actual number of cases of the epidemic disease which have been carefully studied is small, it is significant that with two exceptions—the studies of Olgata and Calmette—the different micro-organisms isolated have all been bacteria which are normally present in the alimentary canal. The cultures may have undergone changes of virulence, but have otherwise retained their original properties unchanged. In the tropical variety a number of micro-organisms have been described as the causative agency.

The disease, as seen in Manilla, appears in two main forms, the acute and the chronic. The stools and intestine contents at autopsy, in Flexner's cases, were scrutinised for amœbæ. In acute cases these organisms were absent, or very difficult to find. This experience in Manilla agrees with the experience of physicians in South Africa, where it is a rarity to find the amœba. In the more chronic forms in Manilla amœbæ were commonly present, but were variable as to actual occurrence and numbers. In a number of these cases large hepatic abscess was present and amœbæ were not always found. In South Africa hepatic abscess is the exception. In one case which came under the writer's observation no amœbæ were present in the pus, and the contents of the abscess were certainly pus, not the broken down liver substance described as occurring in liver abscess due to amœbæ. Flexner finds that the pathological changes in the acute cases differ widely from those of the chronic affections. In the acute affection the large intestine was found dilated, the wall thickened and of increased consistency. There was injection and swelling of the mucous membrane and points of hæmorrhage. No distinct false membrane was found. In the fresh state ulceration was not made out, but on washing, minute ulcerated areas leading into the sub-mucosa could be demonstrated. Amœbæ could not be found in the intestinal contents. In their pathological histology the acute dysenteries differ from the amœbic form, and amœbæ were not discovered in the sections.

Flexner made an elaborate study of the bacteriology of both

[1] "On the Etiology of Tropical Dysentery," by Simon Flexner, M.D., *Bulletin of the Johns Hopkins Hospital*, Vol. xi., No. 115, Oct. 1900.

the acute and chronic forms. Two distinct types of bacilli were separated.

Type I. was a bacillus of the average size of B. coli communis, differing, however, in some of its characteristics. It was pathogenic for ordinary laboratory animals. It was abundantly present in acute cases of dysentery; might, in fact, be the predominating bacillus. It was not found in the ordinary chronic dysentery where amœbæ occur.

Type II. bacilli were present in all instances. In acute cases they were less numerous than Type I. They have a strong resemblance to B. coli communis, their main differences being the rate and extent of growth in different culture media.

These organisms could not be demonstrated in the stools of healthy people in Manilla. The pathogenic properties of Type I. were studied on various animals. Monkeys seemed unaffected by injection (save for local reaction), or by feeding on cultures by the mouth, even after purging. Mice, guinea-pigs, etc., were affected. Death was produced in a varying period, and *post-mortem* swelling of Peyer's patches with ecchymosis in the mucosa was present, along with other pathological changes of a less characteristic nature. The dog may succumb to simple feeding with the cultures. Diarrhœa was present, the intestine was found hyperæmic with hæmorrhages, the cavity of the colon contained a large quantity of mucus from which the bacillus could be recovered. Dead cultures were also found to be toxic. In the case of an animal which recovered, agglutinative properties for the bacilli appeared in the blood.

The bacillus isolated by Flexner agrees very closely with the bacillus found by Shiga in the epidemic dysentery in Japan. The bacillus differs but little from the B. typhosus; it has less motility and is inactive to blood serum from typhoid cases, but reacts to serum from dysenteric cases. In its morphological characters there are some slight differences. The agglutinative reaction was given by the serum of those who had suffered from acute dysentery, where the organisms had been originally present in the stools, but the results in case of chronic dysentery where amœbæ were present were negative.

Flexner concludes that tropical dysentery consists of a bacillary and an amœbic form. He does not conclude that he has fully justified a belief in a specific organism, though it is possible that two specific organisms may be responsible for the epidemic and endemic diseases. The paper is an able study, and places on a firmer basis than heretofore the separation between the two types of tropical dysentery in their clinical history, ætiology, and pathological anatomy. The outlook from the point of protective inoculation and serum therapy seems

hopeful. Inoculations have been made with cultures killed by heat or by chemical agents, and immunity has thus been produced in animals against subsequent inoculation with virulent cultures. Shiga has been able to test the utility of the serum treatment in the human subject. Up to 1st November 1899, Shiga had treated with serum in hospital, in 1898, 65 cases, with a mortality of 9 per cent.; in 1899, 91 cases, with mortality of 8 per cent. During the same period, in Tokyo and Honjo Hospital, 166 cases under ordinary treatment gave a mortality of 37·9 per cent. At Komogome Hospital 398 cases, mortality 34·6 per cent.; in private 1119 cases, mortality 28·5 per cent.[1] Shiga's results are very encouraging, and certainly mark a step in advance in the treatment of dysentery. It may be that better results still may be obtained by protective inoculation. It has not yet been carried out. The only experimental observation recorded on man was by Shiga himself, who directed that a dose of a culture of the bacillus killed by heat should be injected into the tissues of his back. A local reaction and fever resulted. The local reaction was more severe than in the case of the injection of dead typhoid or cholera organisms, suppuration taking place.

The observations so far are very suggestive, and though not conclusive, are well worthy of full consideration by those whose work brings them in contact with acute dysentery. The present treatment of the disease, as seen in South Africa, is far from satisfactory. Flexner's and Shiga's observations mark an advance which opens up a wide field for study by the physician in tropical climates, and where epidemic dysentery is to be found.

SURGERY

THE RADICAL CURE OF HERNIÆ
CALCIUM IODATE—AN IODOFORM SUBSTITUTE

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"TO the making of books there is no end"; and so is it with "Radical Cures for Hernia," for in a recent number of a medical journal two new operations are described (*Lancet*, 2nd February 1901). Such multiplication of methods points either to imperfection of present plans or to undue elaboration of operative procedures. An enquiry, therefore, seems desirable into the *status quo* of this subject. Much may be learned from the

[1] Public Health Reports, Vol. xv., No. 1.

experience of individual operators; and from carefully prepared statistics we may deduce points to guide us in the selection of the best method for each particular variety of hernia. If it can be proved that within the last decade the mortality in inguinal cases has been reduced from 7 per cent. to vanishing point, and recurrences from 30 per cent. to 1 per cent., we may assume that the operations which have yielded these results in many hands and many lands are as nearly perfect as possible. Perfection is attained by steady practice; one operation should be chosen and adhered to—*ceteris paribus*, the one most simple in technique and rapid in execution.

It can, I think, be shown that in inguinal hernia nothing better can be found than Bassini's operation, though Halsted's so-called modification and Kocher's latest "invagination" method give equally good results; that for femoral hernia, Bassini, Kocher, Stimson, and Coley have devised excellent operations, of which the first and last are probably most worthy of trial; while in ventral hernia "layer suture," with proper adaptation of broadly vivified surfaces, is most reliable. As to umbilical hernia opinions are somewhat at variance.

When results so excellent are obtained without necessity for subsequent use of truss or pad, it would appear that we are coming nearer the general recognition of the "radical cure" as the normal treatment of all cases of reducible herniæ, except at the extremes of life or in patients who would be refused operation under any circumstances.

A comparison of some of the more common methods of radical cure is instituted by Rotter in the *Therapeutische Monatshefte*, 7th January 1901 ("Ueber die Radical-operationen freier Hernien"). From his statistics, and others in the writer's possession, the following summary has been compiled:—

Inguinal Hernia.—König in 1889 stated that from the uncertainty of all methods then in use active interference towards radical cure was undesirable. Such a statement, though it would now appear extreme, is not to be wondered at when one remembers the high mortality and the 30 to 40 per cent. of relapses consequent on Czerny's operation which was in use up to the nineties. That Macewen's method gave excellent results, particularly in the originator's hands, cannot be denied, but it has not secured the wide acceptance and popularity of Bassini's. Bassini proposed to imitate the normal condition by forming an inguinal canal running obliquely through the abdominal wall, and not content with removing the "peritoneal funnel" aimed at strengthening the abdominal wall in the neighbourhood of the hernial canal and hernial opening by a dense musculo-fascial layer. Halsted brings the cord above the aponeu-

rosis of the external oblique, and thereby produces greater obliquity of its course. He removes all superfluous veins from the cord, and thus diminishes its size—an important consideration. The latter seems to the writer to be quite as good as Bassini's plan, and in his experience has given excellent results. It is urged against it, however, that it has the disadvantage of a more complicated technique, and that atrophy of the testicle has in a number of cases followed the free removal of the spermatic veins.

A formidable rival of Bassini's method is Kocher's latest "invagination" operation, which has given better results than the original "lateral displacement." Symond's new operation (*Lancet*, 2nd February 1901) is really a modification of Kocher's sac-invagination.

Estimating the comparative value of these operations from the points of view of mortality and permanent cure we find as follows:—

Inguinal Hernia.—

Mortality (including cases which died from causes outside the operation itself).

Operation.	Operator.	No. of Cases.	Mortality Percentage
1. Bassini's.	Bassini, 550 Schnitzler, 400 Coley, 300 Rotter, 400	1650	0·3—0·5
2. Halsted's.	Halsted.	440	0·23
3. Kocher.	Kocher.	191	0·0
4. Macewen.	Macewen.	164	1·2

Percentage of Recurrences after one or more years.

Operation.	Operator.	No. of Cases.	Percentage of Recurrences.
1. Bassini's.	Coley.	549	0·9
	Franz.	593	4·4
	Rotter.	67	1·5
2. Halsted's.	Halsted.	230	4·3
3. Kocher's.	Kocher (Lateral Displacement).	153	2·6
	Kocher (Invagination).	83	1·2
4. Macewen.	Macewen.	107	4·6

These statistics show that Bassini's is the most popular opera-

tion but that Kocher's method gives if anything better results. It would, therefore, appear, that thorough dealing with the "peritoneal funnel" is all that is necessary, and that the efforts of Bassini and Halsted to strengthen the abdominal wall are not requisite. We find, however, that most of Kocher's herniæ were small, only 5 out of 188 being the size of a child's head, and 18 of the size of a fist or goose egg. In most of his cases, therefore, the hernial canal was almost normal and the removal of the "peritoneal funnel" was sufficient to effect a radical cure. Where the herniæ are very large and the obliquity of the canal is lost, Bassini's or Halsted's method is to be preferred.

With regard to material for deep sutures, experience shows that the best is absorbable chromicised kangaroo tendon or catgut sufficiently strong to remain in the tissues for several weeks. Non-absorbable materials, especially wire and silkworm gut, may give trouble months after the operation by causing irritation and suppuration. The writer has had two cases of this kind. In a case some years ago of radical cure after operation for strangulated hernia (reduction *en bloc*), strong silk was used for the deep sutures, which suppurated six months after the operation and came to the surface. Recently a patient presented himself a year after a Halsted's cure had been performed. Three small points of suppuration showed, and from them three silkworm gut mattress sutures were removed. This punctiform suppuration in no way impaired the strength of the cicatrix, the result being perfect in spite of this complication.

Femoral Hernia.—The best known methods are those of Bassini, Kocher and Stimson, and all give good results. Battle has recently described an operation in which he closes the canal by an internal shutter taken from the aponeurosis of the external oblique. It may prove successful under special circumstances. An operation not so well known as the others but deserving of trial, as effectual and easy of performance, is Coley's, where the sac is ligated high up, and the canal closed by means of a purse-string suture of chromicised kangaroo tendon or chromic catgut, the ends of which pass through Poupart's ligament. The writer has done this operation twice recently and found it serviceable.

Femoral Hernia.—

Operation.	Operator.	No. of Cases.	Mortality.	Recurrence.
Bassini's	Bassini	54	0·0%	0·0%
Coley's	Coley	35	0·0%	0·0%
In all operations	—	—	—	0·0-1·8%

Ventral Hernia.—Dr B. Brindley Eads, in a recent paper on "Ventral Hernia following Abdominal Section" (*Annals of Surgery*, Jan. 1901), states that 15 per cent. of all patients upon whom laparotomies have been performed, if examined five years or more thereafter, will be found to be suffering from post-operative hernia. The paper discusses the best lines of incision so far as to avoid undue division of muscle and nerve and consequent hernia. Many cases of ventral herniæ are due to faulty suturing. Suture layer by layer gives ideal results, though peritoneal suture followed by careful approximation of the rest of the abdominal wall with strong and carefully applied silkworm gut stitches is not far behind. The writer had one case of stretching of a cicatrix during labour in a patient from whom an ovarian dermoid was removed, during the fourth month of pregnancy, as it had seriously complicated the previous labour. Hernia is also common in cases where a partial tamponade of the wound has to be made as in peri-appendicular abscess. The results of careful "layer suture" are excellent. Eschenbach found that in 62 laparotomies in the middle line, in 21 Alexander-Adams operations, and in 23 operations for hernia consequent on evacuation of peri-typhlitic abscess, there was no recurrence when layer suture was employed.

Ventral hernia occurs much more commonly in wounds below the umbilicus than above it, and particularly in those that heal by granulation. It occurs more readily when the wound is made through the muscle than when the linea alba is opened. Faulty suture or drainage openings are the common causes of this unfortunate complication, but with present methods it should not occur in more than one per cent. of cœliotomy cases (Kelly, "Operative Gynæcology").

Umbilical Hernia.—The best methods are those of Condamin-Bruns and Kocher. The former remove the entire hernial sac with the umbilicus, and after splitting the rectus sheath, place sutures in four layers: (1) peritoneum and posterior rectus sheath; (2) rectus belly; (3) aponeurosis; (4) skin. Ten cases thus dealt with gave two recurrences.

Kocher removes the sac and umbilicus and closes the opening transversely by deep continuous silk sutures which are also carried through the peritoneum. Seven cases were operated on by him in this way without a recurrence.

Calcium Iodate (Calcinol)—a New Antiseptic.—Dr W. Mackie, Elgin, brought before the profession in a recent number of the *Lancet* (Dec. 29, 1900) a new iodoform substitute and gastro-intestinal antiseptic in the form of iodate of calcium. Sonstadt

in 1872 found it to exist in sea water in the proportion of one part in 250,000, and attributed to it "not only the salubrity of the sea, but through the medium of the atmosphere, of the land also." The same chemist also some thirty years ago made experiments on its properties as an antiseptic and disinfecting agent. Klein (Local Government Board Reports, 1887-88) conducted experiments to test the power of iodate of calcium as a disinfectant. Some of his preliminary experiments proved that besides being harmless to the human system, it had considerable disinfecting properties, "which place it above carbolic acid, permanganate of potash, and phenyl-propionic and phenyl-acetic acids." He found it inferior to perchloride of mercury in its action on bacteria.

Dr Mackie experimented largely with this substance, and finally came to use it as an antiseptic lotion and dressing.

He kindly sent me samples, and after testing them I have ordered it freely for irrigation in cases of tubercular ulceration, of skin and bladder, in specific rhinitis, and as a mouth wash and have found it useful. Whether it will prove serviceable as a substitute for iodoform in the treatment of tuberculous joints by injection has not yet been tested. It can be prepared by any chemist according to the directions given by Dr Mackie in his paper, and the cost is much less than that of iodoform. The cases recorded by Dr Mackie show that the saturated solution and dry salt are very useful as lotion and dusting-powder respectively in suppurating wounds. As it can be used for conditions in which iodoform is inadmissible, and has the additional advantage of being non-poisonous, calcium iodate is certainly deserving of an extended trial.

GYNECOLOGY AND OBSTETRICS

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What is Normal Menstruation? An American answer.—G. J. Engelmann, in two papers (*New York Med. Journ.* 1900, vol. lxxii., p. 986, *Amer. Journ. Obstet.*, Dec. 1900), discusses his investigations of the menstrual records in some 5000 young women, who may fairly be considered representative of the average condition of their respective classes in America, and whose conditions of life are sufficiently close to those of this country to make the results applicable. The girls were at school or college, or engaged in nursing or business, and most of them in the period of adolescence. The influence of physical and nervous influences is very marked on the regularity and frequency of the period and its concomitant pain, and less on its

duration and quantity. Mental strain hastens, and change of surrounding retards the flow. At college, for example, first year students show greater irregularity and marked infrequency, but girls going to the normal from the high school are scarcely affected. Fully 50 per cent. are irregular in recurrence, a change of two days being common, but a range from 21 to 42 days being also observed. Only 31 per cent. recur every 28 days, 45 per cent. being longer. The average duration is 4·6 days, and school and college life exhibit a tendency to shorten this. From 11 to 18 per cent. suffer severely, and under mental strain there is a progressive increase under this head, while the number suffering enough to make it notable is high, varying from 32 to 93 per cent. In girls in business it is 83 per cent. While the premenstrual period is one of heightened activity most admit lessened ability for work during the flow, in girls in business 82 per cent., when the occupation is sedentary, 78 per cent. in floor walkers, who can move about, and 91 per cent. when in saleswomen who must stand. The number needing to be excused from work on occasions is about 30 per cent., but amusements and pleasures are less readily sacrificed, and a very considerable proportion even practise sports, such as tennis, during the period, and this Engelmann adds perhaps more than mental strain causes increase of suffering.

As a means of betterment Engelmann attributes good to gymnasium and physical training, and points out that in two similar classes the amount of ill-health is inversely proportioned to the time spent in the gymnasium. The influence of gymnastics and its teachers in getting the girls to substitute boneless waists for the ordinary corset is also not without its value. The best preventive of all is however on the part of mother and teacher a healthy respect, based on sound knowledge, for the periodic depression in the girl's power of work, and a judicious regulation of the work so as to lie well within the lower limit.

"**A Rational Physical Training for Women** (*New York Med. Journ.* 1900, vol. lxxii. pp. 837-881).—Saxe insists that the character of the movements should be slow and tonic, as in the natural relaxation of the "yawn and stretch." He gives as the essential features of a programme of instruction (1) normal positions and modes of motion; (*a*) normal walking; (*b*) normal standing, etc. (2) Breathing exercises, including tone production and enunciation. (3) Ling gymnastics, in a specially selected series of movements. (4) Apparatus work. The most useful apparatus being (*a*) intercostal machine; (*b*) chest weights; (*c*) leg weights; (*d*) head weights; (*e*) stall-bars (? parallel); (*f*) quarter-circle.

The Relation of the Nose to Menstruation.—In 1884 Mackenzie (*Amer. Journ. Med. Sc.*, vol. lxxxvii. 360), drew attention to certain facts illustrating an interdependence of nasal and genital affections, and mentioned specifically the fact that in a certain proportion of women engorgement of the nasal mucosa is a regular concomitant of menstruation. In 1897 Fliess gave greater precision to the doctrine, stating that the engorgement affects specially the anterior end of the inferior turbinate and the point known as the tuberculum septi. He calls these the genital spots, and says that cocainisation of these points may suspend the pain in dysmenorrheas not of mechanical origin, and that cauterisation may cure the dysmenorrhea. Such statements evoke a ready scepticism, and from this point of view Schiff of Vienna started to examine them. (*Wien. klin. Woch.* 1901, p. 38, Epitome, *Brit. Med. Journ.* Feb. 16, 1901.) Called by the natural man to curse, he ended by blessing them altogether, and indeed by quite out-Fliessing Fliess. He found that not only was the pain of non-mechanical dysmenorrhea, even when there was organic disease under the control of these points, but he could with a 20 per cent. solution of cocain paint out the pain, right or left hypogastric, and right or left sacral, by attacking the corresponding inferior turbinate or tuberculum septi. He found the strongest demonstration of his position in a series of observations, many of which were made under the control of the officers of Chrobak's Klinik, and which one reads for the first time with an involuntary smile. In a woman with a large left adnexal swelling he touched the left turbinate with the cocain plug, when she, without knowing what he was looking at her nose for, said, "That hurts me so down here," pointing to the left hypogastrium. Of sixteen women examined for this, twelve regularly gave like results. Schiff points out the great advantage which this fact gives in the management of dysmenorrhea in virgins, and as some cases of my own are congruent with these results, I have felt justified in calling attention to them. Schiff's paper is certainly interesting, whether further observation fully confirms his results or not.

PSYCHIATRICS

THE CLINICAL STUDY OF PSYCHIATRY

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IN the *American Journal of Insanity* for October 1900, Hoch contributes a suggestive paper upon the Clinical Study of Psychiatry. He points out that development in modern medicine is most intimately connected with the great advances

made in pathological anatomy, and he does not forget that the clinical work came first, and the field was thus prepared for the pathological work.

In the study of insanity unfortunately the reverse method has been adopted with the result that our knowledge of brain diseases which implicate the mental processes is not what it should be. Hoch thinks that in recent years the general attitude of the specialty is changing, and that more clinical work is done now upon a pathological basis. The literature of insanity is not yet overflowing with clinical work. Taking the last number of one of our representative journals there is only one paper out of ten on clinical research, the subject being "The Blood of the Insane," but unfortunately the author has followed much in the lines of many other enumerators of blood corpuscles, and ends a paper which shows much patient labour with the remark that "the examination of the blood in the present state of our knowledge is not even an aid to prognosis or diagnosis (in insanity) as it is in so many diseases." This is not a correct judgment. The blood in various acute forms of insanity does repay examination, and in view of the recent advances made in the study of "immunity" is likely in the future to be a source of advance in knowledge and treatment. Many observers have followed, verified, and slightly extended the work done by Macphail and others, but not to my knowledge has any observer ever approached the subject from a true clinical standpoint and examined the blood, not in a merely mechanical manner, but with due regard to varying temperature, pulse, blood pressure, and mental states.

As Hoch truly remarks, we have heard "more than is desirable" about classification in psychiatry. I do not think I exceed the truth when I say that the classification of mental diseases has done even more to confuse the clinical worker than the attempt to found a science upon the changes to be discovered in the brain tissue of patients *post mortem*. There are various classifications all equally unsatisfactory when worked upon from the clinical standpoint. Hoch says the physician's final aim is to arrive at diseases, while the psychologist merely seeks for deviations from normal functions. There are many psychologists amongst us if this statement be true, certainly our classifications are based more on symptoms of deviation from normal function than upon pathological changes founded upon clinical work. Hoch is afraid that the establishment of "laboratories in insane asylums is somewhat misguided, and may do a certain amount of harm." It is not the pathological work that does harm, it is the attempt to push pathological research before advance in clinical work. We want larger

laboratories, both chemical and pathological, more workers, and a much wider field of investigation. We are all satiated with the details of morbid processes in the brains of General Paralytics. What about the other organs and tissues of the body, are there no changes in them worthy of investigation and likely to advance our knowledge of that hitherto fatal disease? We know that among the earlier physical symptoms of General Paralysis there are disorders of digestion. Yet at *post mortems* little is deemed worthy of careful examinations except the brain. In the acute stages of Melancholia the stomach ceases to digest food ; the kidneys fail in their powers of excretion, yet no one dreams of doing anything else but cutting brain sections from such a subject.

Hoch classifies his principles of study as " manifestations of disease," which he divides for practical purposes into different groups ; namely, the cause, the disease curve or course, the outcome, the symptom-picture, the pathological-anatomical changes, and finally such things as chemical alterations. Hoch apologises for placing causation first upon his list. We are all agreed that given the cause we may be nearer the prevention of the disease. He would be a bold man however who would give causes for many of his cases of mental disease. If Hoch had in his mind the causes of insanity returned in the blue books and annual reports, where "Religious Excitement," "Love Affairs," " Nervous Shock " are returned as causes, he might well apologise ; or such a habit as alcoholism returned to an excessive percentage as a cause where it was probably only a symptom. This of course is largely a matter of the personal equation of the compiler of the statistics. Talking of alcoholism with reference to insanity one superintendent of an asylum in a recent publication with delightful candour informs us that since he turned a total abstainer himself he has been able to cure all his alcoholic patients. If the truth were always told hereditary influences should head the list of causation in mental diseases. Of the other causes at present returned very little can be said. There is however one outstanding clinical variety of insanity, puerperal mania of infective origin, which is known to have a definite cause quite independent of heredity. Dr Macpherson calls it septic puerperal mania, it is in fact an auto-intoxication. This variety of disease can apparently appear in the most vigorous subjects entirely free from nervous or insane heredity. The disease runs a definite course, and the patients are as a rule a class by themselves in no way resembling ordinary subjects of mania or melancholia, whether occuring at the puerperium or any other time. As an observant colleague of mine remarked to me some time ago, " I never can look upon cases of septic puerperal mania as cases of insanity, they are

cases of acute poisoning." One hopes in the future that we will find equally definite causes for the acute forms of mania and melancholia.

The disease curve or course is also a practical matter. One talks of acute mania and chronic mania, acute melancholia and chronic melancholia, but as yet one cannot say when acuteness ends and chronicity begins. There is no difficulty in taking patients whom one knows in a large asylum and saying definitely this is acute and this chronic mania, but if one did not know the patients one could quite easily say a certain case was acute mania whereas it was a case possibly of dementia passing through an attack of excitement. The acute mania is in most cases a case of reparable damage while the chronic mania has irreparable brain damage. Hoch states the difference between the acute and chronic to be in the latter "permanent symptoms," the result of "irreparable lesion," but we are no further forward. There must be some well marked but as yet unknown clinical features which will in the future differentiate between these two classes clearly. Between acute melancholia and chronic melancholia there are certain physical differences, and now I believe it is possible to say definitely, this case is one of acute melancholia, but it is not possible to go further and say from clinical investigation alone this case is chronic. Hoch wishes apparently to abolish these terms acute and chronic, and substitute conceptions referring either to intensity or to duration, but this would not simplify matters. The disease curve and the symptom picture are not at present clearly and definitely defined. Taking at random a modern treatise upon insanity and turning up general paralysis, probably the first headline that catches the eye in big letters is "early moral perversion," and the further mental and physical symptoms of later stages of the disease all follow, but mixed together. There is no definite physical statement of the courses of the disease. One can obtain no information about the blood, the urine, the secretions in the various stages. Melancholia again is described under innumerable varieties, the symptom pictures of each of these are admirably drawn, but the clinical course of the disease is absolutely ignored. The mental symptoms are not as Hoch states "unquestionably the most important manifestations." The mental symptoms are so varied in general paralysis as to be of no diagnostic value. It is upon physical symptoms that one relies. Melancholia has so many and diverse mental symptoms that the disease is burdened with varieties, but the physical symptoms in all these varieties (with the exception probably of Restless Melancholia with low arterial tension, which is probably a disease akin to mania) are similar and of great value in directing treatment. Mental symptoms are of value only to the expert, but the physical

symptoms which we know now and those yet to be discovered, will in the future be the important symptoms of brain disease. Too little importance is, I think, placed by Hoch upon chemical investigations—a field of work full of promise; but he does not discuss this question nor the pathological-anatomical changes.

Referring again to Hoch's groupings of "manifestations of disease," we find that:—

1. Our knowledge of causation is scanty and the little we know of heredity does not assist treatment.

2. The clinical courses of those diseases termed mental have for the most part to be worked at from the beginning. That the psychologist has here an opportunity to work clinically in investigating the workings or deficiencies of each system in detail in each variety of disease. We need a patient, thorough inquiry, assisted by every instrument and appliance supplied by physiology, backed up by sound pathological and chemical investigation.

In making these remarks I do not underrate or forget the work already done. Work without which we would to-day be poor indeed. Advances in general medical and scientific knowledge always precede advances in the specialities. There have been of late great advances in general medicine, in the light of which our knowledge of mental diseases has lost in comparative value.

3. Our "symptom-pictures" are well and accurately drawn, but have to a large extent obscured clinical work.

4. Pathological work has outstripped the sound basis of clinical knowledge.

This question of thorough clinical knowledge of acute mental diseases is of as much importance to the general practitioner as the mental specialist. At present such work can only be done in asylums, but I look forward with confidence to the time when acute recent cases of mania and melancholia will no longer require to be moved to asylums for treatment, but that our knowledge of these diseases will then be such as to enable treatment to be carried out at home.

DISEASES OF CHILDREN

By J. S. FOWLER, M.D., F.R.C.P.Ed.,
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Cyclic Albuminuria.—In a short monograph (Cyclic Albuminuria, London, 1900, pp. 1-63), Sutherland gives a most interesting and valuable account of this condition as observed by him in a number of children. The characteristics of cyclic, as opposed to other forms of so-called functional albuminuria, are as follows. The urine passed before rising in the morning is normal, but as soon as the patient begins to go about albuminuria develops, which diminishes as the day goes on, until at night the urine is

again normal, or contains merely a trace of albumin. Rest in bed completely checks the albuminuria; the urine has remained normal for months, provided only that the patient is kept absolutely recumbent. Even sitting up in bed may, though only in a few cases, lead to the appearance of albumin. So long as the patient lies still, no amount of passive exercise, and no special form of diet will produce albuminuria, and the converse of this is also true, since while the patient is going about the albuminuria is uninfluenced by diet or exercise, though sometimes the latter seems to increase it slightly. The period of the day at which the patient rises has no effect on the albuminuria, which is generally well marked two hours after rising, but may appear as early as fifteen minutes, or be delayed an hour or two. If the patient is made to lie in bed for an hour or two during the day, a double cycle of albuminuria may be observed. The amount of albumin is considerable (·1 to 1·4 per cent., with Esbach's tube), but fluctuates greatly from day to day. It tends to diminish as the general health improves, but very rarely altogether disappears. The albumin occurs in the form of alkali albumin and serum albumin; nucleo-albumin is also present along with serum albumin, but is seldom found apart from the latter. The urine is diminished in amount, especially during the day; except for the absence of albumin the night urine differs in no respect from that passed in the day-time. By giving water freely the amount of urine passed can easily be increased to normal; the albuminuria, however, is unaffected. The urine is, as a rule, loaded, of high specific gravity, acid in reaction. It deposits urates, uric acid, or oxalates on cooling. In rare cases it is alkaline, and contains a deposit of phosphates. Even after centrifuging no casts are to be found; there is neither blood nor sugar.

General symptoms.—The patients are generally nervous children, whose general health is below par. The onset of acute symptoms is usually noticed between the ninth and twelfth year. The child becomes irritable and weeps on slight provocation, he is lethargic, the sleep is disturbed, migraine, rheumatic pains and sweating are complained of. These symptoms tend to remit. On further examination some of the following are usually found: dyspepsia, sore throat, constipation, and attacks of abdominal pain. Anæmia and a degree of cyanosis of the extremities is common; there is often a little puffiness about the eyes, and occasionally slight pigmentation of the skin of the body. Circulatory disturbances, such as tachycardia, canter rhythm, a soft systolic bruit, irregularity, or intermission, may be present. Sometimes there is a fine muscular tremor, and sometimes a slight degree of thyroid enlargement. On the whole, females preponderate among the sufferers. Several children in one family may be affected, and a neurotic heredity is common. As regards its

relation to other diseases cyclic albuminuria seems almost always to be accompanied by the uric acid diathesis; the intermittent albuminuria described as a symptom of exophthalmic goitre is probably of cyclic character. Its relationship with scarlet fever and previous Bright's disease is important. In convalescence from post-scarlatinal nephritis the albuminuria sometimes has a cyclic character; it does not, however, entirely disappear from the urine, and is accompanied by the presence of casts. When true cyclic albuminuria succeeds scarlatina, the event is probably fortuitous. Very many hypothesis have been suggested as to the *etiology and pathology* of the condition. It has been ascribed to oxaluria, a blood disorder, perverted metabolism, the erect posture, gout, etc. The views held may be divided into three groups—(1) cyclic albuminuria is a sign of past or present organic renal disease; (2) it is a physiological condition; (3) it is part of a general morbid state. The writer favours the last of these, which is supported by the general nervous instability displayed by the patients, and the tendency to functional disturbances of the heart, peripheral circulation, digestive system, and urinary organs. Further, the condition has many points in common with the gouty diathesis—itself a toxæmia. He regards the condition as probably directly due to vasomotor instability. The *diagnosis* rests on the examination of the urine. It should be compared before and after rising, and again examined during the day. Should these tests be positive the patient is kept in bed for a day, and all the urine passed is examined. The specimens should also be examined for the presence of casts. It must be distinguished from other varieties of functional albuminuria—"diet" albuminuria, albuminuria the result of exercise, and slight cases of "physiological" albuminuria. No doubt some of these are really cyclic. Further information is needed as to the *duration and progress* of the malady. It has been observed to continue for eighteen years without giving rise to any deterioration of the general health. It is probable that no improvement can be expected during adolescence, but thereafter (1) the nervous symptoms and albuminuria may subside; (2) the albuminuria alone may persist; or (3) the albuminuria and nervous symptoms may persist indefinitely without signs of organic renal disease declaring themselves, while signs of exophthalmic goitre may be superadded. As regards the future development of nephritis the prognosis is good. The condition would probably be a barrier to entering the public services, and would be against life assurance at ordinary rates.

Treatment.—Nothing has yet been found to influence the albumin; under ordinary hospital *régime* a rapid improvement in the general health is usually observed. Our efforts are chiefly

directed towards correcting and relieving the nervous instability by the usual remedies. Insomnia may require the administration of hypnotics, and the periodic gastro-intestinal disorder is lessened by giving full doses of Epsom salts. Bromide of potash and chloral are the best drugs for the relief of the migraine. It is also advisable to restrict the amount of meat in the diet, and to give abundance of water to flush out the system.

Status Lymphaticus and Thymic Asthma.—Friedjung (*Archiv. f. Kinderheilk*, xxix. 344, 1900) gives a good general account of the present views as to the condition described by German writers as the Status Lymphaticus, a subject on which English authors are, as a rule, silent. In the earlier part of the century great importance was attached to enlarged thymus as a cause of laryngismus stridulus, on account of the frequency with which the organ was found hypertrophied along with an otherwise negative *post-mortem* examination. In 1858 Friedleben's monograph on the thymus appeared, and in it he showed that in many cases of so-called enlargement the thymus was really within normal limits, or, at least, that an equally large organ might be found in otherwise normal children. Both Virchow and Cohnheim, however, stated that in fatal cases of laryngo-spasm a hypertrophied thymus was always present. Notwithstanding the views of Virchow and one or two other writers, Friedleben's opinion as to the unimportance of the organ as a cause of respiratory disturbance held the field until the early eighties, when Rauchfuss, Baginsky and Jacobi began to express the belief that the thymus might lead to dyspnœa, and even cause death by its mechanical effect, and cases of sudden death were reported in which the trachea was compressed by a hypertrophied organ. In some cases death was absolutely without warning; in others there was alarming dyspnœa, and in one at least of these the upper mediastinum was opened, and the enlarged organ drawn forward, with immediate relief to the symptoms. Still the question remained unsettled, the chief difficulties being, (1) to show *post-mortem* that the thymus actually did compress the trachea in fatal cases, and (2) the objection that an equally large organ might be found in children who had shown no symptoms whatever. The mechanical theory was modified, in that it was supposed that the pressure might act on the large vessels or the nerves rather than on the trachea. In 1889-90, Paltauf, as a result of a number of examinations of the bodies of children who had died with symptoms of so-called "thymic asthma," came to the following conclusions: (1) In many cases the thymus was not unduly large; (2) in a certain percentage there was a diffuse bronchitis sufficient to account for death; (3) a considerable number of cases showed a hyperplasia of all

the lymphatic structures of the body—thymus, external and internal lymphatic glands, spleen, lymphatic structures about the alimentary tract, etc. To this he gave the name of *Status lymphaticus* or *Lymphatism*. The patients were often pale, fat, and rickety; in adults it was usually associated with arterial hypoplasia. According to Paltauf, the enlargement of the thymus does not by itself cause death, but is only a sign of this lymphatic constitution which, on account of a certain instability of the cardiac action, leads to sudden death from very varied causes. Paltauf's views were supported by Escherich's cases. He thought that the lymphatic constitution predisposed to sudden death, and made the outlook in case the patient took any severe illness a more serious one. The writer has had experience of this in cases of influenza and diphtheria. His conclusions are as follows:—(1) In rare cases sudden death may result from the mechanical pressure of an enlarged thymus on the trachea, or possibly on the vessels or nerves in the neck. (2) Most cases of sudden death are, however, dependent on the existence of this lymphatic habit of body. (3) Laryngeal spasm, as such, has nothing to do with lymphatism, but will most readily prove fatal in children suffering from this disorder. (4) Congenital laryngeal stridor may in some cases be due to enlargement of the thymus. [He admits, however, that few laryngologists favour this opinion, and it is not one which will be readily accepted in England.] Cases of sudden death are constantly being recorded. The following has recently been reported by Kohn (*Deuts. Med. Woch.*, 1901, p. 22). A seven months old child was brought to see him. Until the week before it had always been healthy; the present illness began with a slight cold, which was regarded as influenzal. For the past two days the child had been getting worse, and had stopped taking its food. About an hour before Kohn saw it the symptoms became alarming; the face was very pale and slightly cyanosed, the respirations fluttering, and the pulse imperceptible. The child was fat and well nourished, the heart sounds were faint, and the thorax and abdomen normal. It was obviously moribund, and died in an hour or two. On *post-mortem* examination the thymus measured $3\frac{1}{4} \times 2\frac{1}{2} \times 1\frac{3}{4}$ ins.; the heart was markedly dilated, especially as regards the left chambers; the first part of the aorta was also dilated, the ductus arteriosus was closed, and there was no stenosis of the aorta at its point of emergence. The follicles of the intestines and the mesenteric glands were enlarged. Lungs normal, except for a small fibrocaseous nodule at the right apex. The liver, spleen, and kidneys were hyperæmic; the trachea, vagi, phrenics and recurrent laryngeal nerves normal. Kohn thinks that the enlarged thymus continuously compressed the aortic arch, and led to dilatation of the first part

of the vessel and the left ventricle. No doubt the lymphatic constitution contributed to weaken the cardiac action.

The above summary gives a general idea of the present trend of opinion in regard to this subject of lymphatism. It has considerable interest, not only from the clinician's point of view, but also for the medical jurist. Escherich believes that the tendency to heart failure is so great as to contra-indicate even any very active therapeutic measures in children who are subjects of lymphatism. In a well-known case of sudden death after the injection of diphtheric antitoxin this condition was present. Fatal syncope has also been known to follow the struggling caused by the introduction of a tongue depressor for the purpose of examining the fauces. Both Paltauf and Escherich think that abnormal products of metabolism are present in these cases, and that they weaken the cardiac action.

Meetings of Societies

The Edinburgh Medico-Chirurgical Society

AT the opening of the meeting of this Society held on the 7th February, the President, Mr A. G. Miller, made the following reference to the death of our Beloved and Revered Queen :—

Gentlemen,—Since our last meeting our nation has sustained a grievous and irreparable loss in the death of our beloved Queen. I am sure that I express the feelings of all the members of this Society when I say that we deeply deplore the death of the Queen.

When the history of the reign of Queen Victoria is written, prominence will be given to the great progress of Medical Science. It will be recorded also that during her reign the highest honour ever conferred on a member of our profession has been bestowed on our Honorary Member and former Vice-President, Lord Lister.

The Queen always took a deep and intelligent interest in things connected with our profession, especially in hospitals and in nursing, and we have with us the Victoria Ward and the Jubilee Pavilion in the Royal Infirmary, and the Queen Victoria Jubilee Institute for Nurses, to remind us of our good Queen's interest in all such philanthropic work. What, I think, best represents the nation's sentiments towards our late Queen is expressed in the following words of the apostle Paul, "I thank my God upon every remembrance of you."—*Phil.* i. 3.

The Edinburgh Medico-Chirurgical Society

The fourth meeting of the session was held on Wednesday, January 16th, Mr A. G. Miller, the President, in the chair.

Mr Caird exhibited four cases of pyloric obstruction treated by gastro-jejunostomy. (1) D. M., æt. 35, an alcoholic, suffered from symptoms of gastric ulcer in 1896, but enjoyed good health thereafter till 1899, when pain and vomiting started. Posterior gastro-jejunostomy was performed on December 31, 1900. A hard tumour with many adhesions was found at the pylorus, and many enlarged lymphatic glands. The wound healed by January 16th, 1901, and patient had since gained weight steadily. (2) T. M., aged 44, had a large mobile carcinoma of pylorus with glands involved. Symptoms dated from August 1899. Anterior gastro-jejunostomy was performed December 22nd, 1900, when patient weighed 8 st. 10 lbs. The wound healed about January 16th, on which date his weight was 8 st. 13 lbs. (3) A. T., aged 48, had a very large mobile tumour, without glands. Symptoms dated from 1897. Operation of anterior gastro-jejunostomy was performed 26th December 1900, and patient was now gaining weight rapidly. (4) Mr L., aged 68, first showed symptoms in spring 1899. Anterior gastro-jejunostomy was performed December 14th, 1900, and he was now taking ordinary diet with avidity.

Dr Chalmers Watson gave a histological demonstration on the comparative pathology of ataxia. The animal which afforded the demonstration was a young adult cart horse, nine years old. The clinical features were ataxia involving the hind limbs, slight paraplegia, and a bilateral disease of the knee joints of an unusual nature. The animal could walk, trot, and even canter for a short distance, but all of these movements betrayed the weakness referred to. The ataxic symptoms were most pronounced when the animal was turned, and when an attempt was made to back him. This latter movement was impossible, and in the attempt the hind feet were markedly misdirected. The combination of symptoms led to a diagnosis of a lesion in the spinal cord, most marked in the posterior column, with associated joint lesions. This was verified at the *post-mortem* examination. The demonstration included a series of sections from the lumbar and dorsal cord, photographs of the knee joints, and the "rudimentary" bones removed from the neighbourhood of one joint. The special interest of the case lay in the fact that we were here dealing with an ataxia in a very early stage, and the chief object of the microscopic demonstration was to demonstrate that in this case the vascular changes in the cord were undoubtedly the primary lesion, and

the affections of the neuron secondary. The case, which is believed to be unique, will be fully reported later.

Dr Dawson Turner showed (1) Mackenzie Davidson's mercury interrupter; (2) a rotary mechanical contact, one of his own; (3) the lochnelt electrolytic interrupter. He pointed out that with the last named one, very thick and continuous discharges were obtained, but that they were not of great length. It was quite easy, by using these interrupters, to obtain instantaneous Röntgen photographs of most parts of the body, with the advantage that the plate is less fogged by secondary rays from the tube, and that in many cases distinct shadows of the muscles are shown.

A paper on "The Edinburgh Hospital in South Africa, with notes on the work," was read by Dr Boyd, and is published in the current number of *The Scottish Medical & Surgical Journal.*

Edinburgh Obstetrical Society

THE fourth ordinary meeting of the Society was held on the 13th February. The President, Dr A. Milne Murray, being in the chair. Two ladies were elected to the Fellowship, we believe for the first time in the history of the Society.

A large number of specimens were exhibited. Dr J. W. N. Haultain demonstrated (1) a large œdematous fibroid weighing 29lbs., removed by abdominal hysterectomy. The remarkable feature was the great elongation of the uterine cavity and the extreme thinness of the anterior uterine wall. The patient was aged 45 and had suffered only from the size of the tumour. She had been using pessaries, known as "orange blossoms," for the supposed removal of the growth. (2) Double dermoid ovarian tumours, one associated with supernumerary ostium of Fallopian tube.

Dr Brewis showed (1) a uterus removed for cancer of the body, the only sign being hæmorrhage. Examination of the scrapings, however, showed that the disease was malignant. The President remarked that our ideas regarding the symptomatology of cancer of the body required modification in view of recent cases. (2) Fibroids removed by hysterectomy.

Dr Michael Dewar exhibited two Hodge pessaries removed at intervals of three months from the same patient. These had undergone an unusual change in shape during their stay in the vagina. The patient had not used any hot douche and Dr Dewar had subjected them to a degree of heat far greater than they could be exposed to in the vagina without their undergoing any deformation.

Dr Haig Ferguson showed (1) a large cystic kidney removed

by abdominal section from a girl aged 22, and which presented some of the physical signs of an ovarian cystoma. The kidney was removed by the abdominal opening and the cavity drained from the lumbar region. (2) A photograph showing displacement of the sigmoid flexure of the colon in front of the full-time pregnant uterus.

Professor J. R. Simpson demonstrated (1) an example of ovarian fibroma from a multipara aged 60. (2) Double ovarian carcinoma from a woman aged 26. (3) Double ovarian cystoma. (4) Tubal pregnancy.

Dr Keppie Paterson showed an example of hydramnios of the ovum from a patient who had been troubled with persistent vomiting.

Dr J. Halliday Croom contributed a paper on "Psychoses following pelvi-abdominal operations," which, in his unavoidable absence, was read by Dr Haig Ferguson. The writer noted that mental disturbances were by no means infrequent in ordinary surgical operations, even of a very minor character. The normal functions of the uterus and ovaries were themselves not unassociated with mental aberrations: alterations in the temper or actual hallucinations, disordered appetites were accompaniments both of menstruation and pregnancy. The same occurred with the menopause, a crisis which is more frequently associated with curious mental phenomena than any other period of a woman's life. Puerperal insanity generally occurred in those in which the patient's record showed either insanity or mental weakness in the patient herself previously, in her parents or in the collateral branches of the family. The prognosis of operations upon mentally diseased women or women with neurotic inheritance was serious as regards the rousing up of such morbid mental tendencies. Therefore in such women operations of convenience, which are not necessary for the prolongation of life, ought to be undertaken very guardedly indeed. Dr Croom narrated a case of mental disturbance associated with menstruation in a healthy woman with a good history and unassociated with any operation. This patient exhibited similar symptoms during her pregnancy. He also related cases of insanity occurring subsequent to pelvic or abdominal operations. In one case after curettage for hæmorrhagic endometritis the patient became insane. In this case the diagnosis was obvious and the cure absolutely complete, yet the case ended more disastrously than if the patient had died from acute sepsis.

Another similar result occurred to a young lady aged 25 who was in an extreme degree of anæmia, the result of a uterine polypus. The growth was removed and the patient cured. Two months after the operation, however, she harboured the

delusion that she had been delivered of a child, was consequently an outcast, and was now an inmate of an asylum. In this young lady's history there was no taint of insanity whatever either in her immediate family or among her relatives. This fact seemed to Dr Croom to be a very serious addition to one's views as to the prognosis of any case. All are prepared to discount accidents in insane families, but one has no right to discount such accidents as these in women who have a perfectly clean mental history. That the profound anæmia was not the cause of the mental breakdown in the latter case is shown by the fact that she had improved greatly in health during the two months subsequent to the operation.

The influence which the ovaries and uterus exert over the mind has long been discussed in the abstract, and on that account one is all the more anxious to record concrete examples illustrative of these conditions, in order that others may be prepared for them as they occur.

Though Dr Croom had not himself seen any cases of insanity, subsequent to perineal repair, Kelly has reported six such cases, one of which died in acute mania.

Amongst major operations the field is wider and mental and fatal conditions are by no means unassociated with such procedure. In one case after removal of a simple ovarian tumour the patient died from exhaustion following acute mania, in four days. There was no trace of insanity in this patient. Kelly records eight such cases out of over 2000 abdominal sections; of these five recovered completely, two remained insane, and one committed suicide. Dr Croom's record was, however, not so satisfactory.

In another case of ovariotomy, complicated with adhesions, the patient made an excellent recovery, but on the eighth day she became maniacal and died shortly afterwards. Another case of insanity occurred in a woman on whom hysterectomy had been performed. These cases all illustrate mental disturbances coming on immediately after operation.

In another case melancholia supervened six months after a simple ovariotomy. All these occurred after perfectly simple and successful operations, and were in women who had no hereditary tendency to insanity. There is little reason to doubt that septic infection has a great deal to do in the production of insanity after operations.

As regards the causes which lead to mental disturbances, undoubtedly the first factor is the hereditary one; the second is sepsis, and from these two which are probably the main causes of post operative insanity one can look to a large group occurring under loss of blood, defective action of the kidneys and so forth.

One must remember that in removing the ovaries, one induces the climacteric, and in so doing, one places the woman in all the possible risks of climacteric trouble. It seems probable that the essential pre-requisite for the development of post operative insanity must be in all cases a neurotic organisation, pre-disposed, from either hereditary taint or acquired nervous weakness to take on a diseased action in consequence of any active disturbing influence.

In the cases above referred to, the possibility of sepsis was out of the question altogether, at least of any sepsis that showed itself by any other way than by the insanity.

It has not been shown that insanity is more common after operations on the genital organs than after operations in any other organs. When one considers the frequency with which mental troubles are associated with the normal occurrence of changes such as puberty, menstruation, pregnancy and the menopause, it is remarkable that women escape from these disorders as easily as they do.

Under no circumstances ought any insane woman to be operated upon unless for some distinct condition which is compromising life.

Dr Berry Hart read a paper on "Apparent Low Implantation of the Ureteric Opening," giving rise to incontinence of urine. He first narrated some of the principal cases by Baker, Davenport, Von Massari, Benckiser, and Olshausen. These usually had an apparent ureteric opening in the region of the vestibule near the urethral or hymeneal edge.

After discussing the anatomy and development of the Wolffian duct and ureter, he advanced the opinion that the whole aberrant tube was not ureter but ureter above and Wolffian duct below, and that the anomaly was due to the persistence and potency of the lower segment of the Wolffian duct and of its original junction with the ureter. The operation necessary in such cases was briefly described.

Aberdeen Medico-Chirurgical Society

A MEETING of this Society was held on Thursday, February 7th, Dr G. Watt, President, in the chair.

Dr J. Scott Riddell read a paper on a series of *Abdominal Cases*, which will appear in full in a later number of the Journal. After dealing with a number of interesting abdominal sections, Dr Scott Riddell made special reference to cases of suppurative and perforative appendicitis. Since the discussion on appendicitis last year (v. Journal, March, 1900, pp. 214 and 238), he had

operated on 11 cases of relapsing appendicitis, and the opinion then expressed, that operation was advisable after a second attack, had been strengthened by his subsequent experience.

A number of cases of acute intestinal obstruction from bands and from intussusception were detailed, and the necessity for an early recognition of these cases and immediate operative interference was emphasised. The deadly results of expectant treatment were noted, and the comparatively satisfactory results consequent on early operation were quoted. A diagnosis should be made within a few hours, and a definite line of treatment adopted and adhered to. As Greig Smith had said, "Let it be either drugs or operation, and never that fatal compromise—operation when drugs fail."

An interesting *discussion* followed, mainly on the question of operative interference in cases of appendicitis and acute intestinal obstruction.

Professor Stephenson could remember a number of cases of acute intestinal obstruction which recovered without operation. He could not therefore quite agree with the strong view in favour of operation expressed by Dr Riddell. Such cases of spontaneous recovery must make one hesitate to advise operation in every case, but it was always advisable to have the assistance of a surgeon in watching the course of a case.

Dr Angus Fraser had never, in his own experience, seen a case of acute appendicitis requiring operation (one exception to this statement was mentioned later): in one or two relapsing cases he had advised operation. He referred to one case of chronic intussusception in an elderly man, where 1½ feet of bowel had been passed per anum and the patient made a complete recovery. It was certainly not the fact that every case of acute obstruction would die unless operated upon, and he had personal knowledge of only rare cases of successful operation. Reference was made to three cases in which the surgeon refused to operate because the patients were moribund, and all three recovered. The great majority of such cases would die in any case, and he believed that a larger proportion recovered if treated medically. He certainly agreed with Dr Riddell in his advice to stick to one line of treatment, and, personally, he advocated medical treatment in cases of acute intestinal obstruction.

Dr H. M. W. Gray referred to two cases of successful operation in acute internal strangulation, and he believed that the same good result would have been obtained in other cases if the operation had been done in time. He had usually found a band tying down the bowel. The history of previous peritonitis, or of a previous abdominal operation, were important indications for operative interference. The whole subject was beset with

difficulties in diagnosis, but he would advise operation if urgent symptoms lasted 24 hours at most. He mentioned the successful use of eucaine as a local anæsthetic in operating on strangulated hernia and in the radical cure of hernia.

Dr M'Kerron gave notes of two cases of intussusception in children, in both of which operation was advised, but was not permitted. One died in about two weeks; the other recovered after complete obstruction for a week. Cases of intussusception certainly did recover without operation, and it was always advisable to try inflation and enemata before advising operation.

In replying to the discussion, Dr Scott Riddell said that, in connection with the cases instanced as spontaneous cases in acute intestinal obstruction, these might readily have been cases of peritonitis with paretic distension of the bowel or fæcal accumulation. It was incredible that cases of strangulation by band, volvulus, or even intussusception, could be cured by medical treatment; such a course would aggravate rather than allay the trouble. Operation was as necessary as in strangulated hernia, and should be done even earlier, if possible, than in that condition. The case quoted by Dr Fraser of a cure after 1½ feet of bowel had been passed per anum was evidently one of gangrenous intussusception, in which the result was gratifying but very unusual. Cases of intussusception, taken in time, gave excellent results by operation. Inflation and enemata should certainly be tried; but, if these proved unsuccessful, operation should be done within 24 hours. In many cases of suppurative appendicitis cited as cures without operation, the abscess had burst into the caecum or rectum. Early recognition and operation were necessary to prevent troublesome fistulæ, produced in this way, apart from the greatest danger of all—rupture into the general peritoneal cavity.

Forfarshire Medical Association

THIS Society met on Thursday, February 7th, in the University College, Dundee, at 8.30, Dr C. S. Young, Vice-President, in the chair.

The Chairman, in a few well-chosen words, referred to the nation's loss since their last meeting, and thought that each had felt a personal loss in the death of their late Queen, and proposed the following resolution:—"That the members of the Forfarshire Medical Association desire most respectfully to record their profound sorrow at the calamity which has befallen the Empire in the death of their beloved and revered Sovereign, and to express their sincere and heartfelt sympathy with His Majesty, the King, and other members of the Royal Family."

This was agreed to in silence.

Mr Greig then gave an interesting account of his experiences as civil-surgeon to the Natal Field Force in South Africa, which he joined at Ladysmith last April, and left at Standerton in October. He recounted in detail the methods adopted by that force in the treatment of the wounded on the field, down to their being invalided from the service or returning to duty, and pointed out how their methods differed from those laid down in the regulations. He then spoke of the various battles and encounters with the enemy which that force had fought on its way to the Transvaal, the elaborate preparations made by the enemy throughout the war, by which means they were enabled to readily obtain the range for their guns, and also by their roads and by natives could rapidly change their guns about from one position to another and back.

Notes of some interesting cases of the many he had had under his care were given, some of bullet wounds, illustrating the wonderful escapes from mortal injury.

Notes of cases of shell wounds, which showed the terrible injuries caused by the shells, and also notes of a few bayonet wounds, were also given.

A large number of lantern slides were shown at the end of the lecture, being photographs of the places the force passed through; of hospital trains and other means of transporting the wounded; of infantry advancing to the attack under cover of artillery; also of sketches of his own.

At the close Mr Greig was heartily thanked by the Chairman, in the name of the Association, for his most interesting and instructive lecture.

Royal Medical Society, Edinburgh

11th January 1901, Dr Peel Ritchie in the Chair.

1. Dr C. H. Watson read a dissertation on "Evolution and Disease."

2. Dr G. Lyon showed two specimens. (1) An odontoma removed from a woman at 37; (2) a sarcoma removed from the erector spinæ of a soldier.

3. Dr Stuart read a case of spinal disease causing a lesion of the posterior columns of the cord in the lower dorsal region.

18th January, Dr Ross in the Chair.

1. (*a*) Dr R. A. Ross showed a man with Charcot's disease of the left shoulder joint. In this case inco-ordination and ataxic gait had existed for several months before any joint disease was discovered; (*b*) Dr Ross also described the case of

a man who was admitted to the Infirmary in a state of coma. There was a history of the removal of a new growth from the sole of the left foot four years ago. At the *post-mortem* disseminated nodules of melanotic sarcoma were found in the heart and lungs, and also one on the inner surface of the skull which had given rise to hæmorrhage which was the cause of coma and death.

2. Mr Wm. Mair, M.A., described two cases of exophthalmic goitre.

1st February, Dr Lyon in the Chair.

1. Dr Harvey Baird read a dissertation on "General Paralysis of the Insane."

2. (*a*) Dr H. D. Shepherd showed a tumour removed from the superior maxilla of a youth, æt. 19. The tumour caused bulging of the right side of the face with displacement of the eye, and showed a soft projection into the posterior nares, which was diagnosed as a mucous polypus. On operation a large "odontoma" consisting of very hard material was found, with a very vascular capsule which was what was felt inside the nares; (*b*) Dr Shepherd described a case of appendicitis which was operated on 18 hours after the commencement of the attack. The appendix was found to be already gangrenous.

3. Mr J. H. M. Bell described a case of catarrhal jaundice.

8th February, Dr G. Lyon in the Chair.

1. Dr Boyd and Dr Chiene gave an account of their experiences with the Edinburgh Hospital in South Africa.

2. Mr B. A. Spence read a dissertation on Ambulance and First Aid.

New Books and New Editions

A Topographical Atlas of the Spinal Cord. By ALEXANDER BRUCE, M.A., M.D., F.R.C.P.E., F.R.S.E. Edinburgh: Williams & Norgate. 1901. Price 42s.

THE aim of Dr Bruce in producing this topographical atlas of the normal human spinal cord has been "to provide representations of sections regarded as typical of each of its segments with a view to determine (*a*) the relative arrangement of the grey and white matter, and especially the form of the anterior cornu characteristic of each segment; (*b*) the distribution of the motor nerve cells, and the relation of the distribution and number of these cells to the conformation of the anterior cornu; and (*c*) other features which may serve for the identification of any segment in which the form of the anterior cornu is not sufficiently distinctive for that purpose." "It is hoped that the

normal standards thus provided may not merely prove useful for the identification of the segment to which sections submitted for examination belong, but may serve as a basis for comparison with pathological conditions, and as an aid to the study of localisation of the motor functions of the cord."

The illustrations consist of thirty-two very beautiful photogravure plates, presenting side by side typical sections from two series of preparations. The first series, photographed with a magnification of twenty diameters and occupying the upper portion of each plate, shows the arrangement of the nerve-cells as displayed by staining with toluidin blue; the second, photographed with a magnification of ten diameters, demonstrates the shape of the grey matter as depicted in sections prepared by a modification of Heller's method. One plate is devoted to each segment, excepting that two are required for the illustration of the characters of the eighth cervical segment, on account of the marked differences it presents in its upper and lower parts. In three other instances, for similar reasons, two figures showing the arrangement of the nerve cells are given. Each plate is concisely described on the page that it faces. The comparative features of the various segments are dealt with in a short, but sufficiently complete and very clearly written introduction. The origin, course and termination of the various cell-groups in the anterior horns are minutely described, and several new and important anatomical facts are brought out. It is shown that, as soon as the arrangement of the motor cell-groups in the anterior cornu, and the form of the cornu, which depends upon that arrangement, have been fully appreciated, it becomes a comparatively simple matter to recognise any one segment in the cervical and lumbo-sacral regions. The dorsal segments are not, however, so easily distinguished. Whilst the first, second, eleventh, and twelfth have characteristic features, it is difficult, if not impossible, to identify the intermediate segments. It is nevertheless possible to tell whether a given section from this region has been taken from the upper or from the lower part, and to place sections from different segments in their order in the series.

The particular anatomical features that this atlas serves to illustrate have hitherto been comparatively neglected, but their great importance, more especially as a means of identification of the various segments, is here amply proved. The work cannot fail to be of great utility, both in the pathological laboratory and in the class-room. It ought to give a new element of exactness to future descriptions of morbid changes in the human spinal cord, for with its aid the pathologist should have little difficulty, excepting in the instances

noted above, in determining the segment to which any set of sections belong. Such definiteness of localisation in descriptions of spinal cord lesions constitutes a most important advance in pathological anatomy. In rendering its attainment not only possible, but easy, Dr Bruce has added in considerable measure to the very large debt which neurological science already owes him. His new atlas cannot be regarded as an independent edifice; it is essentially built upon the wider foundations of the knowledge and experience obtained by years of original research upon the anatomy of the nervous system, for without these it could neither have been planned nor successfully completed. It is certain at once to take its place as a standard work upon the topography of the spinal cord.

"CAUDA EQUINA."

A Manual of Surgical Treatment. By W. WATSON-CHEYNE, M.B., F.R.C.S., F.R.S., and J. F. BURGHARD, M.D. and M.S. (Lond.), F.R.C.S. In six parts. Part IV., pp. 370 with 138 illustrations. Cr. 8vo. London: Longmans, Green & Co. 1900. Price 14s.

THE fourth part of this Manual fully maintains the high standard of the previous volumes. It is largely taken up with the consideration of the surgical affections of joints, beginning with a short chapter on the general aspects of dislocations, after which the dislocations of the individual joints are discussed in detail. We are disposed to agree with the authors in their strong advocacy of the use of a general anæsthetic in the reduction of all dislocations, convinced as we are that by following this routine practice much damage to the soft parts, with subsequent impairment of function may be avoided. The value of systematic massage *from the first* is also duly emphasised. We would have been glad if the authors had abandoned the term "unreduced dislocation" as applied to dislocations of old standing. Obviously every dislocation is unreduced—after reduction it is no longer a dislocation. Our own experience does not confirm their opinion that dislocation of the sternal end of the clavicle "is of very rare occurrence, and is usually accompanied by other serious injuries."

The chapter on sprains is most valuable, but we feel that sufficient distinction is not made between contusions of joint surfaces and sprains.

As was to be expected, the chapters on tuberculosis of joints leaves little to be desired. While the newer methods of treatment, such as those by injections of iodoform, Bier's congestive

method, and the free use of pure carbolic acid in exposed tuberculous foci, receive their due share of attention, we are pleased to note that the value of the actual cautery in the treatment of the chronic inflammation associated with tuberculous infection, as advocated by Syme, is strongly emphasised. The paragraphs on the use of extension in tuberculous affections of joints are full of practical suggestions and should clear away certain misconceptions as to the rationalé of the procedure which are widely current.

The chapter on ankylosis would be more satisfactory if a clearer distinction were made between rigidity, contracture, and true ankylosis of joints.

The second division of this volume is concerned with the surgery of the spine. The practitioner will find the appendix to the chapter on scoliosis most valuable. It consists in a detailed description, with illustrations, of the gymnastic exercises appropriate to the different degrees and forms of this deformity, copied *verbatim*, we are told, from Dr Percy Lewis' work on "The Relief and Cure of Spinal Curvatures."

Without being captious in our criticism, we would suggest that the author's definitions are frequently wanting in lucidity, and that the style of many paragraphs is marred by their inveterate tendency to split their infinitives. "SCOT."

Fractures, with an Appendix on the Practical Use of the Röntgen Rays. By CARL BECK, M.D., New York. Royal 8vo, pp. 335, 178 illustrations. Philadelphia: W. B. Saunders & Co. 1900. Price 15s. net.

WE have it on the authority of Herodotus that "nothing gives such weight and dignity to a book as an Appendix." Whatever weight the work before us may carry depends, in our opinion, on its appendix. Dignity is an attribute to which we fear few surgical treatises can lay much claim, and that at present under review abounds too freely in passages of loosely written English and undiluted Americanese to rank higher than its neighbours in this respect.

This is the first treatise we have met with avowedly written to mark the advances in our knowledge of fractures which have resulted from the use of the Röntgen Rays, and after a careful perusal of its pages we confess to a feeling of disappointment that the great discovery of which we had expected so much has, as far as the evidence of Dr Beck's work shows, taught us so little.

That radioscopy and radiography are of the greatest assistance in the diagnosis of many difficult cases we readily and gratefully admit, but to maintain, as the author does, that "accuracy now takes the place of ignorance and doubt," and to suggest that the discovery of Röntgen has revolutionised our knowledge regarding the diagnosis and treatment of injuries of bones and joints, is clearly to use the language of exaggeration, and to cast a reflection on the past masters of surgery which is unjustified by facts.

In saying this we in no way desire to depreciate the value of the X-rays in this department of surgery, but we feel strongly that at present there is a tendency in certain directions to rely too implicitly and too exclusively on the evidence which they afford. For, after all, this evidence is now, and probably for long will be, only at the disposal of those who practise in large towns and in hospitals. To the vast majority of practitioners, especially in the country, it is unavailable. There is obviously, therefore, great danger in teaching our students to neglect the ordinary physical signs and symptoms of fractures in favour of a method of diagnosis which may not always be at their command.

If there is one point more than another on which we should have expected fresh light from the X-rays with regard to fractures, it is on the formation and consolidation of callus. Yet we find that on this subject the author merely quotes the statistics of Gurlt (1862), without stating whether or not they are confirmed by radiography. In his introductory chapter Dr Beck says that, "in regard to the so-called Potts' fracture, many fresh facts were revealed by the rays, so that, just as in fracture of the lower end of the radius, our former views have been changed completely." After reading this we naturally turned to the pages descriptive of these important injuries, but we must confess that with regard to fractures of the radius we failed to find anything which necessitated a change of our views, in fact there is nothing stated with regard to these injuries which Bennet of Dublin did not tell us many years ago, and we miss from the present author's description many interesting and important facts which other observers long since established. Nor do we find in these pages any fresh information on the vexed question of "the so-called Potts' fracture," the description of which, in our opinion, is quite inadequate in a monograph on fractures.

The author has studied the use of the X-rays under the direct supervision of Professor Röntgen in his own laboratory, and the clear description of the apparatus, contained in the appendix, the practical directions for its use, and the valuable

observations on the errors to be guarded against in interpreting its results, prove him an able exponent of this difficult technical procedure. His skill is further attested by the beautiful radiograms with which the work is illustrated.

As a contribution to the literature of fractures, however, we have found this book unsatisfactory, and as an exposition of the value of radiography very disappointing. "SCOT."

The Report of the Anæsthetic Committee of the British Medical Association. Published at the Office of the Association, London. 1900.

THE Report of the Anæsthetic Committee of the British Medical Association has at last appeared and is of very great interest to the profession. It is based on the clinical evidence afforded by details of 23,920 administrations of the different anæsthetics collected from various sources throughout the British Isles. These have been arranged and sub-divided, and the conclusions to be drawn are given in a summary at the end.

As to the relative safety of anæsthetics there is little that is new to be learned from it. The view, very generally held, that ether is safer than chloroform, and that A. C. E. stands in an intermediate position, is merely confirmed.

Chloroform is found to put the patient's life in jeopardy once in 200 administrations, ether once in 1500; and these figures are sufficiently striking to make those who advocate the universal and exclusive employment of chloroform as a producer of anæsthesia at least to pause and reflect on the position they take up. Of twenty-nine fatalities which are recorded, eighteen are found to have occurred during the administration of chloroform. Emphasis is laid—and very wisely—on the fact that there is a distinction to be drawn between death during the administration of an anæsthetic and from the anæsthetic, *i.e.* from its toxic effects.

No particular method of administering chloroform is recommended for general adoption, and this seems rather unfortunate, but the personal factor for safety—the individual who administers—is considered to bulk largely.

Severe and prolonged vomiting is found to be more frequent after the administration of chloroform, while, though vomiting is relatively more common after ether, it is of a milder and more transient type. A chart is given which is of interest, showing the relative safety of anæsthetics at different ages. The idea that there is very little chance of any untoward

occurrence in giving chloroform to children is a prevalent one, but that this does not hold good in regard to very young children is shown by the chart. Anæsthetics are best borne by children from ten to fifteen years of age.

As to the best methods of restoration, the Committee are unable to come to any definite conclusion, and we are left to fall back on our old friends, jaw elevation, tongue traction and artificial respiration, as being reliable and always at hand.

The final conclusion of the Committee is that by far the most important point in the safe administration of anæsthetics is the experience acquired by the administrator. It is quite obvious that a very large proportion of anæsthetics must be given by men without much experience. Only in the Metropolis and in the larger provincial towns are special anæsthetists available, and accordingly students cannot be too strongly urged to take every possible opportunity of increasing their practical acquaintance with anæsthetics. The time when some evidence of knowledge of the properties and mode of exhibition of these agents is systematically enforced at the qualifying examinations of the universities and licensing boards is surely not far distant.

T. D. L.

Orthopædic Surgery: a Hand-book. By CHAS. BELL KEETLEY, F.R.C.S., Surgeon to the West London Hospital. Pp. 539, illustrated. London: Smith, Elder & Co. 1900. Price 16s.

IN common with other surgeons, Mr Keetley finds a great difficulty in the definition of what is understood by orthopædic surgery. The term is indeed a vague one, and the boundaries of the department decidedly artificial; still, orthopædic surgery, as a special line of work, has perhaps as much to justify its existence as many another so-called "specialty," and if orthopædic surgeons do not usually include in their programme such conditions as squint, harelip, and the like, it is quite an open question whether they have not as good a right to commandeer them as, let us say, the gynæcologist has to excise the breast or the kidney.

The book written by Mr Keetley is eminently practical, interesting and instructive. There are evidences on every page of large experience and intelligent deduction on the part of the author, added to a thorough study on his part of contemporary writings on the subject, both British and foreign.

The printing of the book is excellent, and misprints are comparatively few; the illustrations are numerous, and, for the most part, useful and sufficiently accurate. A very good point is the synopsis at the beginning of each chapter, which enables the

reader to find at once the exact piece of information he is looking for.

In most cases Mr Keetley expresses opinions which are practically those held by the majority of British surgeons; here and there he has arrived at somewhat different conclusions. It may be interesting to notice some of his views in the case of a few common disorders.

In genu valgum Mr Keetley is strongly opposed to osteoclasis except in the case of babies; he has little belief in the effectiveness of splints in rickety deformities of the legs, and trusts largely to osteotomy by Macewen's method. The descriptions of most operations in the book are particularly clear, practical and useful; and the description of Macewen's operation is no exception to the rule, though it might have been advisable to have insisted upon the importance of fixing the *heel* firmly to the splint after osteotomy of the femur, so as to prevent eversion of the limb and consequent flexion at the knee-joint with its attendant evils.

The author says: "Flatfoot occurs in persons of the same age as those who suffer from genu valgum and lateral curvature, and I agree with those pathologists who believe that all these varieties of deformity are of rachitic origin." This is a somewhat sweeping statement, and while many cases (perhaps more than is usually supposed) are of rachitic origin, one is hardly prepared to believe that rickets is responsible for all those cases in young healthy growing—and usually overgrowing—boys, who, apart from the flatfoot, show absolutely no other indication of rickets whatever. And are we not to believe that flatfoot may come on as the result of injuries and debilitating diseases which interfere with the nutrition and tone of the muscles concerned in the support of the arch?

In the treatment of talipes Mr Keetley strongly condemns Phelps' operation, as we think rightly, as, in most cases, a needless division of skin and other innocent soft parts.

Amongst the causes of hammer-toe, no mention is made of the hereditary factor.

Mr Keetley holds strong views on the subject of Calot's operation for rectification of spinal deformity due to tubercular disease, and these views are not complimentary to the procedure. In this opinion he will probably be strongly backed by the large majority of surgeons.

The author's directions for the application of plaster of Paris and other jackets in spinal curvature are most excellent.

In congenital dislocation of the hip, Mr Keetley believes in non-operative treatment up to six years of age, but in older children, or in those cases where the acetabulum is rudimentary,

he considers operation, by Lorenz', or some similar method, imperative.

There is a paragraph in the chapter devoted to deformities of the toes, which will doubtless warm the heart of any surgeon who has had much dealing with these matters: "An intelligent and honest bootmaker, who will co-operate loyally with the surgeon and subordinate his own prejudices, deserves every encouragement."

The amount of information in this book is very considerable, and it is put before the reader in an eminently practical and interesting way.

A Short Practice of Gynæcology. By HENRY JELLETT, B.A., M.D., etc. Pp. xiii., 436. 125 illustrations. London: J. & A. Churchhill. 1900. Price 7s. 6d.

THIS companion volume to the author's "Short Practice of Midwifery," is likely to meet with a similar favourable reception. It is compact, clear and well-illustrated, and it supplies just the amount of knowledge which the student asks for. The treatment in the main follows the Dublin School and the description of operations is lucid and good. The pathology, as is evident from the discussions of uterine displacement and uterine inflammations, is less satisfactory, but that is probably less the fault of the author than of the present state of the science. In teaching methods of examination it is to be regretted that the advisability of ambidextrous practice is not insisted on. The contrariety between the text and the relative diagram illustrates the point.

Note

British Congress on Tuberculosis

THIS Congress, which is to be held in the Queen's Hall, Langham Place, in the week beginning July 22nd, 1901, has arranged, amongst other matters, for three public addresses to be delivered in the Large Hall on Tuesday, Wednesday and Thursday of that week. The first will be given by Prof. Robert Koch of Berlin, discoverer of the tubercle bacillus, the second by Prof. Brouardel of Paris, and the third by Prof. M'Fadyean of the Royal Veterinary College.

NOTICE.

All communications to the Editorial Department, including Exchanges and Books for Review, should be addressed to THE EDITOR, Dr W. RUSSELL, 3 *Walker Street, Edinburgh, and all business communications, including Subscriptions, Advertisements, &c., to* THE SUB-EDITOR, Dr NORMAN WALKER, 7 *Manor Place, Edinburgh.*

THE SCOTTISH
MEDICAL AND SURGICAL
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NOTES ON THE TREATMENT OF DISEASES OF THE NERVOUS SYSTEM

By J. J. GRAHAM BROWN, M.D., F.R.C.P.E., F.R.S.E.,
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Lecture IV.—On the Treatment of Paralysis resulting from lesion of the upper motor neuron

SUMMARY

The upper motor neuron—its position and arrangement—its course—various lesions—descending degeneration.

The question of primary lateral sclerosis—its symptoms—the findings of morbid anatomy in fatal cases—the usual diseases underlying the symptoms of "spastic paraplegia."

Clinical characters of paralysis of the upper motor neuron—general statement in regard to its treatment—the toxine affections—removal of cause.

Treatment of infantile cerebral paralysis—of myelitis—by drugs—serum treatment—ordinary indications for treatment—attention to bladder—avoidance of bed-sores—their treatment.

Disseminated sclerosis—its probable etiology—treatment by drugs—general rules as to mode of life—precautions.

Mechanical pressure on the fibres of the upper motor neuron—conditions favouring this—effects of such pressure.

Sudden increase of intracranial pressure—extra-dural hæmorrhage—its treatment—cerebral hæmorrhage—ordinary position—results on the neuron—general symptoms of apoplectic attack—their method of origin.

Treatment of the apoplectic attack—indications—various means for reducing blood-pressure—and arresting hæmorrhage—later treatment.

Slow increase of intra-cranial pressure — chronic hydrocephalus — its mode of origin — and results — treatment by drugs — operations for removing the fluid — indications — trephining — lumbar puncture.

Intracranial tumours — the way in which they affect the upper motor neuron — irritative and destructive lesions — symptoms which result — convulsions — monoplegias.

Treatment of brain tumour — by drugs — syphilitic treatment — iodide of potassium — palliative drug treatment — surgical treatment — small number of cases in which this is possible — points which suggest advisability of surgical interference — only after thorough trial of drugs — and when tumour can be localised — and lies within reach — and is of suitable character.

Palliative trephining for brain tumour — indications for this — relief it affords — of tension — of pain — of optic neuritis — indications as to where the trephine opening should be made — lumbar puncture — intra-cranial abscess.

Increase of pressure in spinal canal — hæmatomyelia — its treatment — tumours of the cord — their effects — and treatment — by drugs — by operation — indications for surgical interference.

Tubercular disease of the spine — its results on the neuron — treatment — by drugs — by rest and extension — method of applying this — its good effects — sudden and forcible extension — laminectomy — when necessary — indications.

Destruction of the upper motor neuron from softening — thrombosis and embolism — treatment of these conditions.

Management of certain special symptoms — of the paralysis in its chronic stages — of contracture — and spasmodic jerking — of tremor.

THE cells of the upper motor neuron, with their protoplasmic processes or dendrites, lie, as you know, in the motor area of the cerebral cortex. The axons or axis-cylinders of these cells pass down the motor tracts, traversing in turn the internal capsule, the cerebral peduncles, the pons, the medulla oblongata (where the majority cross in the decussation), and the pyramidal tracts of the spinal cord, some, however, being diverted to the motor cerebral nuclei. They end in arborisations round the cells of the lower neuron in the anterior horns of the cord, and in the corresponding nuclei of the motor cranial nerves.

Through this long course the upper motor neuron is exposed to many forms of injury. It may be attacked as a whole by the toxines of disease, but more usually the lesion which affects it is somewhat localised. The cells in the motor cortex may be destroyed by meningitic processes, by polio-encephalitis, by cortical hæmorrhage, by thrombosis or embolism with subsequent softening, by the pressure of tumours, and by

other like causes. In the neighbourhood of the internal capsule, the seat of election of cerebral hæmorrhage, the fibres of the motor tract, that is, the axons of the upper motor neuron, may be torn and compressed by such bleeding. Or, hæmorrhages or tumours at lower levels, in or in the near neighbourhood of the pons or medulla, may seriously implicate the upper motor neuron. Similarly, as the axons stretch their long way down the cord they may be affected by local processes there. The pressure of broken, dislocated or diseased vertebræ, spinal meningitis, myelitis, tumours, hæmorrhages, may, one and all, produce paralysis by involving the upper neuron. And, in both brain and cord, disseminated sclerosis may cut the neuron here or there with resulting paralysis.

And, just as in the case of the lower neuron, the trophic influences which determine the nutrition of the whole unit proceed from the cell, so in the case of the upper. Any disease which destroys the cell in the cortex causes the neuron as a whole to degenerate, and thus we have a descending degeneration of the axons of these cells, that is, of the motor or pyramidal tract in the brain, medulla and cord. Any one of the lesions just mentioned which cuts the axon causes the peripheral part of that fibre to degenerate, because it is thereby separated from its nutritional centre, the cell in the motor cortex.

As to the so-called system diseases of the cord in which the upper neuron is affected, such as primary lateral sclerosis, amyotrophic lateral sclerosis, ataxic paraplegia, I think that you will understand their position and etiology best if you consider them not as cord lesions but as lesions of the upper neuron. A toxine may so deeply affect the whole neuron as to cause degeneration of the cell with its dendrites, the axon and its arborisations—the whole unit in fact. If such a process go to the length of complete degeneration, traces of such degeneration would be found after death in the cortex, in the internal capsule, in the peduncles, pons, medulla, and down the whole length of the cord. But in some cases the process does not, at first at any rate, go to this length. If you have merely so much disturbance of the functions of the cell as will lead to an impairment of its trophic influence, of its nutritional power, then that part of the neuron which is most difficult to nourish—that is, the part removed furthest from the cell—will suffer most and will first

show signs of degeneration. Hence it is that in some cases the degeneration is found only in the cord, in the furthest extremities of the upper neuron. In this way you may explain to yourselves the method of origin of those cases of disease in the cord, in which the pyramidal tracts there are affected without there being any trace of visible degeneration in the parts of the upper neuron which lie within the brain. Either the severity of the poison was not sufficient to destroy the neuron as a whole, or sufficient time was not given it to develop its full effect before the patient died. It produced only so much depression of vital action in the cortical cell as to lead to degeneration of the more distant part of the axon, that is, degeneration of the motor strands in the cord.

There seems to be so much confusion regarding the disease known as primary lateral sclerosis, that I am tempted to repeat and to amplify somewhat the remarks I have already made to you on the subject.[1] The group of symptoms which form the clinical picture of spastic paralysis was first described by Charcot in the year 1874,[2] and almost immediately thereafter by Erb.[3] These consist of a slowly advancing paralysis or paresis chiefly of the legs, accompanied with stiffness and rigidity of the muscles, and by marked exaggeration of the deep reflexes. No form of sensation is affected, there are no vaso-motor or trophic changes or genito-urinary or rectal troubles.

Charcot suggested, with great acuteness, that this group of symptoms must be due to lesion of the pyramidal tracts, an opinion which Erb shared, but neither of these great clinicians had the opportunity of examining the cord from a pure case of this description. The disease is a very chronic one and does not threaten life, and death is usually due to some intercurrent affection. As a rule the lesions found are complicated, and do not correspond to the theory of pure lateral sclerosis. Many indeed deny that such a disease exists.

The recorded cases which have, in their morbid anatomy,

[1] In a course of lectures on neurology, unpublished.

[2] Charcot, "Leçons cliniques sur les Maladies du System Nerveux," ii. Ser. 3 Fasc. Paris, 1874.

[3] Erb, *Berliner klin. Wochenschr.*, July 1875; and in *Virch. Arch.*, Bd. 70, Heft 2, June 1877.

proved to be nearly pure examples of primary lateral sclerosis are very few in number. The first is that of Morgan and Dreschfeld,[1] in which there was distinct degeneration of the pyramidal tracts in the cord extending up to the medulla, and apparently no other lesion. But when the specimens were more completely examined Dreschfeld[2] found that there was also some degeneration in the cells of the anterior horns. Strümpel's case[3] was likewise a nearly pure example of lateral sclerosis, but in it also there was some degeneration of the cells of the lower motor neuron, so that it must be considered as a case of amyotrophic lateral sclerosis. In the year 1896 Dejerine and Sottas[4] published the case of an alcoholic who had, during life, exhibited symptoms of spastic paralysis. The pyramidal tracts were degenerated from the upper end of the cord downwards, but there was also some degeneration in the posterior columns. The most recent case is that recorded by Democh[5] from Hitzig's clinique in Halle, in which the symptoms during life were those of typical spastic paralysis in an alcoholic. After death there was found degeneration of the pyramidal tracts in the cord, but there was also slight degeneration of the columns of Goll and a hydromyelia towards the lower end of the cord. Probably this case approaches as nearly as any yet met with to the pathological findings which ought theoretically to characterise primary lateral sclerosis. The condition of hydromyelia did not probably give rise to any symptoms, and the slight degeneration noted in the columns of Goll is not uncommon in chronic alcoholics.

One hears sometimes the diagnosis of primary lateral sclerosis made during life, but probably in almost every case this diagnosis is wrong. Pure instances of the affection must be of exceeding rarity. In truth the clinical picture of spastic paralysis, which is a very well defined one, may be encountered

[1] Morgan and Dreschfeld, "Idiopathic lateral sclerosis," *British Medical Journal*, Jan. 1881, p. 152.

[2] Dreschfeld, *Journal of Anatomy and Physiology*, vol. xv. (1881) p. 510.

[3] Strümpel, "Ueber einen Fall . . . mit den Symptomen einer allgemeinen spastichen Lähmung," *D. Zeit. f. Nervenheilk*, Bd. 5, May 1894.

[4] Dejerine and Sottas, "Sur un cas de paraplegie spasmodique," etc., *Arch. de Physiologie, normal et pathologique*, vol. viii. (1896) p. 630.

[5] Ida Democh, "Ein Beitrag zur Lehre von der spastischen Spinalparalyse," *Arch. f. Psychiatrie und Nervenkrankh.*, Bd. 33, 1900.

at the early stage of several different diseases among which may be mentioned, amyotrophic lateral sclerosis, ataxic paraplegia, myelitis, syringomyelia, disseminated sclerosis, and neoplasm of the cord. In the majority of such cases the diagnosis signs of one of these lesions will appear subsequently. Very similar symptoms may also occur in hysteria.

You will remember that in speaking of the lower motor neuron it was pointed out that whatever part of that neuron was affected the resulting phenomena were essentially the same. A like rule holds good as regards the paralytic symptoms produced by lesion of the upper neuron. Whether the neuron is attacked as a whole or whether the axons are involved at some particular point in their course down the motor tract, the essential signs as regards paralysis are the same. These signs are, briefly, as follows :—

The muscles involved are withdrawn from the influence of Will, they are paralysed. But, in contrast to the condition which obtains in the case of the lower neuron, the paralysis here is spastic, the tonus of the muscles is increased, the deep reflexes are exaggerated, clonus is often present, and there is a strong tendency to contracture. On these, taken together with the history of the case, the diagnosis is based, and without going further into the matter, it may be said generally that there is seldom any great difficulty in determining whether or not the upper motor neuron is involved in the lesion. What the seat of the lesion may be, and of what nature it is, are points which can only be settled by careful consideration of the symptoms as a whole, their order and mode of onset, the age of the patient, the condition of other organs, etc. The question of diagnosis does not, however, concern us here.

As regards treatment it may be said, speaking generally, that lesions of the upper motor neuron are less amenable to treatment than are those of the lower. The upper neuron is of later development than the lower, more specialised, more delicate, more susceptible of injury and less capable of repair. Still, in many cases treatment does great good.

If the cause of the lesion can be determined you will seek as far as may be to remove it. This point has been fully

considered in a former lecture so far as relates to the toxines of disease, to alcohol and to metallic and other poisons. In this connection you will recall the case of a man whom some of you saw, who was suffering from the results of chronic lead-poisoning, the poison having attacked the upper motor neuron. When we saw him for the second time after he had been under treatment for some months with a view to the removal of the lead salts from his tissues, we found that his spastic symptoms had disappeared.

The toxines of influenza, rheumatism, tubercle and syphilis, and of many other infective complaints are apt, especially in neurotic subjects, to attack the upper neuron. These demand in each case appropriate treatment. I have, for example, seen symptoms from the side of the upper motor neuron disappear after the removal of a tubercular testicle. And, if you recall the nature of the lesion in many cases of infantile cerebral paralysis that will remind you that the upper motor neuron may be attacked by toxine processes of unknown origin, and probably there are several varieties of these.

The treatment of those cases of infantile cerebral paralysis which arise from the action of some toxine on the motor cerebral cortex is no more satisfactory than that of the corresponding lesion of the anterior horns of the spinal cord. The patient as a rule comes under observation only after the cortical destruction has gone its full length. The paralysis, which usually affects one side of the face, one arm and one leg, but chiefly the arm, tends to improve somewhat in the months which follow the occurrence of the lesion, and this improvement may be aided by massage. Beyond using cod-liver oil and tonics (among which strychnine should not be included in the cases in question) medicinal treatment is of little avail.

After the acute stage has completely passed away I have seen some good follow the practice of tying up the healthy arm so as to force the child in his play to practise moving the affected hand. In this way he gets back some of the power which he had lost, and it is not too much to imagine that fresh centres may thus to some extent be educated to take on the work of those which the toxine has destroyed. Carefully devised gymnastics will also do good, but they must not be so protracted or so energetic as to produce any considerable fatigue.

Some further remarks as to the subsequent treatment of these cases will be made towards the end of this lecture, when we come to consider the after-treatment of spastic paralysis generally.

Myelitis, another disease in which the upper motor neuron suffers, its axons in the cord being involved in the inflammation, is also in almost every case, if not invariably, the result of the action of micro-organisms, or their toxines. Syphilis is not uncommonly the cause, and in such cases the myelitis comes on usually within two years of the date on which the primary sore showed itself. When the myelitic symptoms appear in a person the subject of syphilis a vigorous course of antisyphilitic treatment should be commenced at once, and it is necessary to push the administration of mercury as rapidly as possible. Hypodermic administration of the drug finds its proper use in acute cases of this kind, as indeed I have told you in a former lecture.

Apart from syphilis, the cord may be invaded and myelitis started by various unknown toxines. Among the micro-organisms of known character which have been proved to act in this way may be mentioned the following:—streptococcus, staphylococcus, pneumococcus, influenza bacillus, bacillus coli communis. This microbic origin of myelitis would suggest that a serum treatment is that likely to be of most avail in such conditions. There is, however, only a small number of such serums available, and even those which are procurable have shown themselves to be useless in these cases. Even in that myelitis which can be produced in animals by inoculation of the spinal meninges with cultures of known organisms, and therefore under conditions in which serum therapeutics can be most favourably carried out, no curative result has been attained. Marinesco,[1] for example, experimenting very recently with streptococcus in this way, found that even when the culture and the anti-streptococcus serum were given together (he used Marmoreck's serum) no very evident effect was produced, save perhaps that the animals so treated did not die quite so rapidly as the control animals did.

[1] Marinesco, "Nature et traitement de la myélite aigue," *Nouv. Iconographie de la Salpêtrière*, November to December 1900.

The future will, however, almost certainly place in our hands the means of carrying out satisfactory serum treatment in cases of myelitis.

But, while awaiting and expecting the advent of a series of satisfactory serums, we must in the meanwhile continue to treat cases of myelitis on the old and empirical lines. Absolute rest in bed is of course essential, and the patient should not lie on his back. This would make the spine the most dependent part of the body—an undesirable position for an inflamed organ. He should rest either in the prone posture or on one side or the other. At the commencement of an acute myelitis some good may be done by giving the patient a vapour bath, but this should be done in bed and without any unnecessary movement. The bowels are to be freely opened, and some observers have seen benefit follow the application of leeches over the spine. The diet during the acute stage should be that of fevers generally. As to medicines, it is usual to give mercury in some form, and salicylate of sodium may occasionally be of benefit. Ergot has been given in these cases, but I have never seen any benefit follow its use. In the later stages iodide of potassium should be used. But the medicinal treatment of myelitis is very unsatisfactory.

Attention to the condition of the bladder is of very great importance in all cases of myelitis. If there be retention of urine a catheter ought to be passed, and the bladder thoroughly emptied. It is likely that the instrument will require to be used very frequently, and the most scrupulous care must be taken to avoid the introduction of organisms. It should be remembered that in cases of myelitis the mucous membrane of the urinary tract has much less vitality and resisting power than in the normal condition, and is therefore more easily infected during the operation of passing a catheter. If cystitis does occur, and even in most careful hands this complication sometimes arises, the bladder should be washed out at least twice in each twenty-four hours with some antiseptic solution. Boracic lotion (gr. 10 to the ounce) does very well, or solution of quinine, or very diluted perchloride of mercury solution may be used. But in these cases you ought always to give antiseptics by the mouth at the same time. I have usually employed boracic acid or salol for this purpose. Lately I have

once or twice seen excellent results from the administration of urotropine.[1] This substance, which is more correctly designated as hexamethylene-tetramine, is believed when it reaches the blood to break up into ammonia and formaldehyde. The latter, which is of course a strong antiseptic, passes into the urine.

Another very important point is, by careful nursing, to avoid the formation of bed-sores, from which indeed many patients die. The readiness with which such sores form on the sacral region and at other parts where pressure comes, is to be explained partly on the ground of the low vitality of the skin and partly by reason of the fact that the patient cannot feel that the pressure has at any time been too long continued, and cannot turn so as to relieve that pressure. The skin also is moist with decomposing perspiration, and is apt to be soiled with urine and fæces, especially if the evacuations are involuntary. The nurse who is careful to avoid this distressing complication will see that her patient is placed upon a water-bed, and that the bed linen and personal linen are frequently changed. She will see that he is turned from time to time from one side to the other. She will wash the skin of the back at least twice a day, and after thoroughly drying it will rub in some strong spirit, dusting it over, finally, with boracic acid powder. If necrosis of the skin does take place, and this will sometimes happen even with the best nursing, the slough should be kept dusted with iodoform until it separates. After this the sore is best dressed with boracic lotion.

It may be well, at this point, to remind you that disease of the upper motor neuron does not of itself give rise to vaso-motor, or trophic symptoms, or to incontinence of urine and fæces. It is only when, as in myelitis, the lesion passes to other parts of the central nervous structures that we see added trophic changes in the skin, muscles, joints, etc., vaso-motor disturbances, and bladder and rectal troubles.

Disseminated sclerosis, like myelitis, has in all probability a micro-organismal origin in many cases, but it may also occur as the result of the action of certain metallic poisons such

[1] This substance is sometimes called "formin" and sometimes "aminoform," a most perplexing and irritating multiplication of names.

as lead. Alcoholism also is one of its causes. As the patches of sclerosis involve the axons of the upper motor neuron at some point or another, and usually at many points, a word may be said here as to its treatment. Clearly if you can find evidence that lead or some similar metal is acting, your line of treatment will be evident. The same may be said of those cases in which syphilitic infection has preceded the attack.

But in those instances in which there is no evidence of such causes the treatment is not in any sense hopeful or satisfactory. Of the drugs used, that which seems to do most good is nitrate of silver, and I have certainly seen benefit follow its administration. Prolonged courses of arsenic are said sometimes to influence the disease favourably.

Otherwise the patient should be advised to lead as easy and equable a life as may be possible to him, to maintain his nutrition at a high level, to winter abroad if he can, and to avoid strain of all kinds. Excesses *in venere* are specially harmful, and alcohol should be sparingly used; indeed, having regard to the sensitiveness of the upper neuron to this drug, the patient would be safer if he abstained from its use.

Gowers has shown that pregnancy and labour are apt to accelerate the progress of disseminated sclerosis, and female patients should, when necessary, be informed of this risk.

Let us turn now to the more mechanical side of the question and consider the results of pressure on the upper motor neuron. It is to be remembered that the whole length of that neuron lies, in the adult at any rate, in a cavity surrounded by bony walls. It differs essentially in this respect from the lower neuron, the greater part of which is situated in the soft tissues. Within the skull or the spinal canal any tumour, or any effusion of blood or serum may give rise to pressure sufficient to compress the upper motor neuron and interfere with its functions.

The effects of increased intracranial pressure are strikingly seen where that pressure arises suddenly. The simplest example of this is that extra-dural hæmorrhage which follows the rupture of the middle meningeal artery, a condition usually though not always the result of trauma. There can be no doubt here as to what the treatment should be, and some of

the most brilliant results of modern cranial surgery have been those which followed trephining and ligature of the vessel in such cases.

The matter stands otherwise when we come to consider the question of ordinary cerebral hæmorrhage, say into the lenticular nucleus and neighbouring parts. Here the indications for treatment are not so clear and the results of that treatment are not nearly so satisfactory as in the case we have just referred to. The hæmorrhage tears up and destroys more or less completely the parts into which it first breaks, and among these the axons of the upper motor neuron in the internal capsule are usually to some considerable extent included. The mechanical shock of the escaping blood traverses the brain substance in all directions like a wave until it breaks on the cranial bones. If the effused blood be of any amount it produces an increase of intracranial pressure, to which indeed the compressed and flattened convolutions often seen after death testify. In this way such fluid as can be made to leave the cranium—blood, lymph, cerebro-spinal fluid—is forced out, and considerable anæmia (especially of the cortex) is brought about. In the immediate neighbourhood of the hæmorrhage the venous return is apt to be specially impeded with resulting œdematous swelling. This still further increases the pressure on more outlying parts.

The coma which follows the apoplectic attack is the outward expression of the cortical anæmia produced in such ways as the above, and perhaps also produced reflexly from the irritation of hæmorrhage in the central grey matter.

If, now, you are called to see a case of apoplexy, from cerebral hæmorrhage, in the stage of coma, what are the indications for treatment. It is clear, in the first place, that any hæmorrhage which is still going on should be arrested. No unnecessary movement of the patient should take place. He should be gently conveyed to the nearest bed and allowed to lie there in such a position and with his clothing so arranged as to allow of the free return of venous blood from the head and neck. If the diagnosis is certain and if there are signs of a continuing hæmorrhage, and if the site of the lesion is the

usual one, it may be advisable to compress the carotid artery in order to diminish the rate of the circulation and so allow of clotting and the arrest of hæmorrhage. It may even be advisable to ligature that vessel in special cases, as in one recorded by Dercum and Keen,[1] where this procedure produced very satisfactory results. The power of clotting of the blood may be increased by the administration of chloride of calcium, and as the conditions are urgent the remedy should in this case be administered hypodermically.

It has been pointed out that the cause of the coma in such cases is in all probability anæmia of the cortex resulting from increased intracranial pressure. This pressure not only causes coma but also injures other parts of the brain which have not been directly destroyed by the hæmorrhage. The blood tension and consequently the intracranial tension can be considerably reduced by free purgation. For this purpose croton oil or calomel may be usefully employed and the lower bowel may be emptied by means of an enema.

By far the quickest and most effectual way of reducing the intracranial tension is by blood-letting. Venesection, formerly so much employed, has fallen into an unreasonable disrepute. He who is bold enough to abstract blood in suitable cases may see the coma shortened and the general symptoms ameliorated. But before venturing to abstract blood either by opening a vein or by the less objectionable method of applying leeches to the neck, he must first of all make a clear and certain diagnosis of cerebral hæmorrhage, for such a practice as blood-letting in the case of embolism or thrombosis would be very harmful. The cases in which venesection is likely to do good are those in which the face is darkly flushed, the pulse slow and full and the coma deep and of long duration. The good effects of venesection in suitable cases depend not merely on the removal of a certain quantity of blood from the circulation but also on the fact that this reduces cyanosis. One of the results of dyspnœa is contraction of the arterioles and a consequent high-blood-pressure, and the reduction of the cyanosis lowers the blood-pressure materially.

[1] Dercum and Keene, "Two cases of Ingravescent Cerebral Hæmorrhage treated by ligation of the common carotid artery," *Journal of Nervous and Mental Disease*, vol. xix. (1894) p. 286.

After the stage of coma has passed the use of iodide of potassium may aid in the absorption of the extravasated blood, and in that way help in restoring the function in those axons of the upper motor neuron which have not been actually destroyed by the lesion.

In contrast to the rapid increase of intracranial tension which we have been considering, there stands the slow but very steady and great increase seen in chronic hydrocephalus. In the large proportion of these cases the lesion is due to some obstruction of the drainage from the lateral ventricles into the sub-arachnoid space, whether that obstruction is in the iter, in the fourth ventricle, or at the foramen of Majendie or the other openings into the sub-arachnoid meshwork. The result of this is that as the fluid continues to collect in the ventricles and finds no way of escape, the ventricular system becomes distended and the intracranial pressure gradually rises. As a result of this the brain substance becomes atrophied, being compressed between the ventricular fluid and the walls of the cranial cavity. The atrophy is, I think, accelerated by the fact that as the intracranial pressure rises and becomes more and more nearly equal to the pressure at the highest part of the blood wave, less and less blood enters the brain and its nutrition seriously fails. In the course of this brain atrophy the upper motor neuron suffers, degeneration passes down the pyramidal tracts, and the limbs show signs of spastic paralysis.

In such cases medicinal treatment is only of avail where the primary lesion is a syphilitic meningitis. Probably in all cases, and certainly when there is any evidence of syphilis, an energetic anti-syphilitic treatment should be given.

Any effort to check the accumulation of fluid by the application of plaster or bandages to the head is obviously wrong in theory and is worse than useless in practice. It is not difficult to relieve the pressure temporarily by tapping one of the lateral ventricles. This may readily be done by inserting an aspirator needle through the lateral corner of the anterior fontanelle. The procedure requires to be repeated from time to time as the fluid re-accumulates, because it is not advisable to leave in a permanent drain. The operation is at best only

palliative, and it is not to be recommended save in special cases, for example when convulsions are occurring frequently.

When the obstruction lies, as it often does, at the foramen of Majendie, the operation described by Lees and Barlow[1] of trephining the occipital bone and so getting at and draining the fourth ventricle, is no doubt the best in theory. The results in their cases were not, however, satisfactory. If any operation is to be performed at all it should probably be that described by Sutherland and Watson Cheyne,[2] whereby a permanent drain is established between one lateral ventricle and the sub-dural space. In a case recently recorded by Schramm[3] this method was followed by remarkable improvement. He used a drain of formalin-catgut which had been soaked for twenty-four hours in a 1 per cent. solution of chromic acid and then for twelve hours in absolute alcohol.

A consideration of the usual method of origin of these cases would lead one at once to assume that any attempt to drain the ventricular system by means of Quincke's lumbar puncture would be useless, and this assumption is justified by clinical experience. In very few of the cases in which it has been tried has any good resulted. The reason for this failure lies, of course, in the fact that as the obstruction is situated between the ventricles and the spinal meninges no drainage of the latter can be of avail.

Intracranial tumours, in the great majority of cases, affect the upper motor neuron. They do this either by injuring the motor area of the cortex or its sub-cortical fibres directly or indirectly by reason of the general increase of intracranial pressure which they produce. The pressure of the growing tumour leads to œdema of the neighbouring brain-substance and then to a low form of inflammation and softening. Other varieties of tumour infiltrate, their elements becoming mingled with the cerebral tissues which they destroy as they go. As

[1] Lees and Barlow, in Clifford Allbutt's "System of Medicine," vol. vii. p. 558.

[2] Sutherland and Watson Cheyne, "A Case of Chronic Hydrocephalus treated by Intracranial Drainage," *Transactions of the Clinical Society*, 1898.

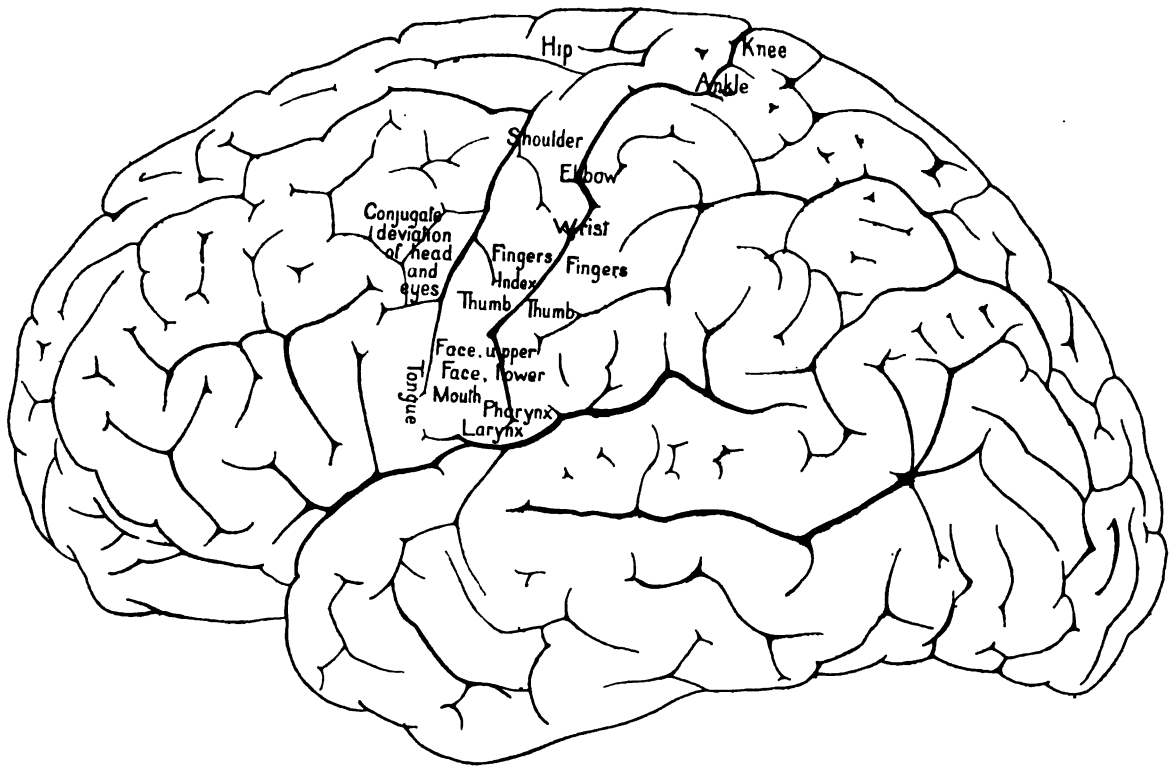
[3] Schramm, "Beitrag zur Behandlung des chronischen Hydrocephalus mittels intracranieller Drainage," quoted in the *Jahrasber ueber die Leist. u. Fortschr. der Neurologie, &c.*, vol. iii. p. 993.

the tumour increases in size the intracranial pressure rises and occasions those signs which indicate that a neoplasm is present within the cranial cavity. The effects of such a tumour upon the upper motor neuron are, as a rule, at first irritative and subsequently paralytic. It is only with the phase of paralysis that we have here to do.

A tumour involving some part of the motor area will usually at first give rise to Jacksonian epilepsy, but presently it will be noticed that there is some temporary paralysis after each attack. This probably results from exhaustion of the cortical cells which have been irritated, but as the tumour grows these cells are thrown more or less completely out of function, and the paralysis becomes permanent. But while this is the usual order of events, cases are sometimes met with in which the paralysis comes without preceding spasm, and a monoplegia is the first localising symptom of a tumour in the motor cortex. In any case the paralysis is limited, at any rate at first, and shows itself as a monoplegia of the face, of the arm, or of the leg. Or it may be even more localised than this, and may involve, for example, only the extensors of the great toe. There will be found in such a case, however, some slight paresis of other muscles of the limb whose cortical centres lie close to those of the muscles which are fully paralysed. As the tumour grows this paresis will deepen into full paralysis. The paralysis takes the type of that of the upper motor neuron, the muscles preserving their volume with a high tonus and exaggerated deep reflexes. Occasionally there may be some muscular wasting, but there is never any reaction of degeneration.

Tumours in the central ganglia usually involve the pyramidal tract in the internal capsule, and so give rise to a hemiplegia. The fibres of this tract are so closely packed together at this point that they usually suffer together, but there are a few cases on record in which the encroachment of the tumour was so partial that a monoplegia was produced.

When the crus is involved there results a hemiplegia with crossed paralysis of the oculo-motor nerve, and when the tumour attacks the pons the usual result is that the arm and leg on the opposite side of the body are paralysed, and the face



APPROXIMATE POSITION OF MOTOR AREAS ON LEFT CORTEX—*after* DEJERINE.

on the same side. This is not the place to enter further into detail in regard to these points.

The results of treatment in cases of brain tumour are far from satisfactory. Drug treatment is of avail as a curative agent only in a small percentage of cases, and surgery in a still smaller. I do not mean that brilliant results are not occasionally attained, but the number of cases which are permanently benefited forms but a very small percentage of the whole.

Medicinal treatment is almost limited to cases of gumma, that is, in so far as actual cure is concerned. Palliative measures may be usefully employed in every case. In cases of brain tumour which from the history of the case or for any other reason are believed to be syphilitic, the most vigorous antisyphilitic treatment ought at once to be commenced. Iodide of potassium has a wonderful effect in such cases, but it has to be given in large doses. It is well to begin with 10 grains three times a day, and rapidly increase the quantity taken until at least 90 grains are taken in each twenty-four hours, and it is often advisable to go considerably beyond this quantity. In many cases it is necessary to order at the same time a course of mercurial inunction. Under these influences the symptoms of cerebral gumma abate, and in many cases disappear with a wonderful rapidity.

The advantages to be gained from the use of iodide of potassium are not absolutely limited to cases of syphilis, though they are much more conspicuous in the case of gumma than in any other cranial tumour. Considerable improvement sometimes follows its use in cases of sarcomatous, gliomatous and tuberculous growths. Quite lately I saw the symptoms in a case of tuberculous tumour undergo a most marked improvement under the action of this drug.

Arsenic is said to be of service in some cases of cranial tumour, but I have not seen any noteworthy benefit follow its use.

In cases of tubercle the administration of cod-liver oil and of tonics (particularly, I think, iodide of iron) is indicated. When the symptoms are not severe some improvement might be expected if the patient were allowed to lie in the open air

as much as possible. This practice is certainly of benefit in cases of tubercular disease of the spine.

Beyond these indications medicine is only of use in cases of cranial tumour in combating symptoms. Of these the most severe and intractable is headache. Antipyrin and its allies may sometimes succeed in diminishing the pain, but usually (short of operation) the only means in our power is the use of morphia.

If, then, medicine can help but little in cases of intracranial tumour, how much assistance can we expect from surgery? The statistics regarding the operability of such tumours, contained in the works of Hale White,[1] Seydel,[2] Byrom Bramwell,[3] and Oppenheim,[4] and particularly the mass of facts contained in the recently published edition of von Bergmann's work,[5] do not encourage optimism. As far as these statements go, it would appear that out of a hundred cases of brain tumour, about five are under conditions which justify the performance of an operation with a view to their removal. Probably about one-half of these operations are successful, but there is no certainty as to this point, as unsuccessful cases are not always published.

What are the points, then, which may guide us in deciding to call upon a surgeon to operate in a case of intracranial tumour? It is clear, in the first place, that it is only after a thorough trial has been made of medication by means of iodide of potassium, and after that has been proved to be ineffectual for removing symptoms, that there should be any appeal to surgery. Regarding this point a word may be added to what has been already said. It has been stated that in cases of gumma, especially when seen at a comparatively early stage, this form of treatment clears the symptoms away wonderfully quickly. There are, however, cases, and especially old standing cases, in which this satisfactory result is not completely attained.

[1] Hale White, *Guy's Hospital Reports*, vol. xxiii. (1886) p. 117.

[2] Seydel, *Verh. der deutsch. Gesellschaft f. Chirurgie*, Bd. 21 (1892) p. 32.

[3] Byrom Bramwell, *Transactions of the Medico-Chirurgical Society of Edinburgh*, Session 1893-94.

[4] Oppenheim, "Die Geschwülste des Gehirns," Wien, 1896.

[5] E. Von Bergmann, "Die chirurgische Behandlung von Hirnkrankheiten," 3te Aufl. 1899.

In these an operation may subsequently become necessary to remove scar tissue and thickened membranes. A case of this kind came under my treatment some months ago. The patient had acquired syphilis in South America many years ago and had not then been subjected to proper treatment. The brain symptoms had existed for a considerable time before he came under my notice, and although they yielded to a considerable extent to treatment with iodide of potassium and mercurial inunction, they did not completely disappear.

Another necessary condition preliminary to operation is that the site of the tumour should be localised. It is, of course, very desirable that this localising diagnosis should be perfectly exact, but I am far from holding that absolute certainty is necessary. If other things are favourable, a strong probability that the tumour in question lies at a particular point would justify interference if the symptoms were severe and the need for operation pressing. There are, however, many regions of the brain from which a tumour cannot be removed, even with the advances of modern surgery. Tumours of the medulla, pons, base of the brain, basal ganglia, ventricles, corpus callosum, and those lying deep in the hemispheres, are all beyond the reach of operation. And it is only exceptionally that a cerebellar tumour presents itself under sufficiently favourable circumstances (in one lateral lobe, and near its lower and posterior surface) to justify an attempt being made to remove it.

Therefore, you see, it comes to this, that only those tumours, cortical or sub-cortical, which lie on the convexity of the hemispheres, are capable of removal. The majority of those brain tumours which have been removed have been in the motor area, probably to a large extent because they are more easily recognised and localised when they are so situated. Of the long list of such tumours contained in von Bergmann's work, over 70 per cent. lay in the motor area.

But, unfortunately, not by any means all of the tumours so situated are removable. The operation is the more easy to perform the nearer the tumour lies to the surface, the more definitely it is encapsulated, and the smaller it is in size. A large size is not, *per se*, a contra-indication to operation. Von Bramann, for example, removed a tumour weighing more than

eight and a half ounces. But if a considerable portion of the brain tissue is infiltrated by the tumour growth, a satisfactory removal would be impossible.

The character of the tumour is therefore of great importance in this regard, but unfortunately in many cases a diagnosis of its nature is not possible. Carcinoma, which is almost always secondary to similar tumours elsewhere, does not lend itself to operation. Tuberculous growths in the brain are often multiple, and in this case as well as when there is active tubercle elsewhere, operation is not to be recommended. But when the tuberculous brain tumour is single and accessible, there is no reason why it should not be removed. Such tumours lie very frequently, however, in inaccessible situations in the cerebellum and about the base of the brain. Sarcomata, which lie invariably surrounded by a capsule, are very favourable for removal, as are also fibromata and cysts. Gliomata are apt to infiltrate the brain substance, and this renders their removal difficult but not always impossible. Allusion has already been made to the occasional necessity for recommending operation in cases of syphilitic gummata.

But, while surgical interference is of curative effect in but a very small proportion of cases of brain tumour, it is capable of affording relief in many. When the surgeon, having made a window in the cranium, and having laid the tumour bare, finds that its complete removal is not possible, he may greatly relieve the symptoms by excising a portion.

When the patient is suffering severe pain, or when blindness is increasing, a palliative operation is indicated in cases in which the position of the tumour cannot be localised, or, being localised, it is known to lie in some inaccessible region, provided that medicinal treatment has failed. In these circumstances the operation of trephining, by relieving intracranial tension, diminishes or may even remove many of the distressing symptoms to which that tension gives rise. In particular, the agonising pain, the vomiting, the convulsions, and the mental symptoms, if these exist, are relieved or removed by such an operation. The optic neuritis also, if it have not gone too far, may be much relieved, and the further progress towards atrophy may be arrested.

The probable results of trephining on optic neuritis have been discussed in a paper by Taylor.[1] He showed, by reference to various cases, that not only may the neuritis be relieved by the removal of an intracranial tumour, but that the mere act of trephining in cases where the tumour is out of reach may, by relieving pressure, stop the neuritis. But this is not always the case, as I have myself had occasion to observe in a recent instance of this kind.

If such palliative trephining is to be performed for the relief of pressure the opening made in the skull should be a large one, and the dura mater should be fully divided. So far as I am able to judge, the best method of trephining in cases of cerebral tumour is that modification of Wagner's method, devised by J. M. Cotterill and described by him in the "Encyclopædia Medica," vol. ii. (1899).

There remains to be considered the question of where the window in the skull should be made in these cases of palliative trephining. In cases in which, though no approach to exact localisation is possible, there is some suspicion that the tumour may lie at some particular point, it is clear that the opening ought to be made there, on the chance of the tumour revealing itself and proving to be capable of complete or partial removal. But in those cases in which there is no sort of indication of the site of the tumour or in which the growth is known to be inaccessible the surgeon should be asked to make his opening over one of the so-called "silent areas" of the brain, so that, in the event of a hernia cerebri resulting, a very important part of the cortex may not be thrown out of function.

When the pressure and distortion of parts produced by the growth of the tumour has interrupted the flow of cerebro-spinal fluid from the ventricular system to the sub-arachnoid space, it may be necessary, in addition to the operation of trephining, to open the lateral ventricle and so allow the fluid to escape.

Sometimes Quincke's lumbar puncture has been tried with the view of relieving intracranial tension in cases of brain tumour, and while in some cases relief appears to have followed that procedure, in most instances it has not succeeded. This

[1] J. Taylor, "Optic Neuritis in its Relation to Intracranial Tumour and Trephining," *Trans. of the Ophthalmological Society*, vol. iv. (1894) p. 105.

failure is probably due to obstruction of free drainage from the ventricular system to the sub-arachnoid space and spinal meninges. Indeed Oppenheim records a case in which after each tapping the patient experienced an increase of the pain in the head, and one or two instances of sudden death after the operation have appeared in the literature.

In regard to abscess occurring within the cranial cavity, it is only necessary to say that in all cases (save in the metastatic multiple form) when a diagnosis and if possible a localising diagnosis has been made, the treatment is purely operative, and should pass into the hands of the surgeon with an indication as to where the trephine opening should be made.

So far our attention has been directed to the results on the neuron of increase of pressure, sudden or gradual, within the cranial cavity, and the means at our disposal for removing these. When we turn, as we now must do, to the corresponding lesions in the spinal canal, we shall find that the principles which underlie treatment are essentially similar.

Hæmorrhage into the spinal cord (the condition known as hæmatomyelia) gives rise to a sudden increase of pressure within the spinal canal, and its effects on the upper motor neuron are due chiefly to compression. Its fibres are not, in most cases, torn up by the hæmorrhage, for the extravasation occurs, as a general rule, in the grey matter of the cord. The treatment of this condition is very much that of cerebral hæmorrhage. Rest is as essential in the one case as in the other, but in bleeding into the cord conditions of gravitation make us wish to keep the patient lying in the prone posture or on one side rather than on the back. The hæmorrhage may be arrested, or at least its arrest may be accelerated by venesection in suitable cases,[1] by the application of leeches over the spine, or an ice-bag there, and perhaps by the injection of ergotin. The excitement of the circulation may usefully be stilled by administering morphia hypodermically. Meningeal hæmorrhage should be treated on the same lines. But in this case the use of

[1] See on page 300 the indications mentioned in connection with cerebral hæmorrhage.

morphia will be more urgently required on account of the violent pain which usually accompanies such bleeding, and further, if there be signs in a case of meningeal hæmorrhage indicating that the cord is being compressed, it is advisable to call upon a surgeon to perform laminectomy.

If we except tubercular disease of the vertebræ and the neighbouring meninges, about which I shall have something to say presently, it may be safely stated that tumours involving the spinal cord are rare. When they occur they produce the usual pressure effects, œdema and anæmia of the parts affected, and sometimes some inflammation. Among these parts the axons of the upper motor neuron in their way down the pyramidal tracts are notably affected. If a diagnosis of spinal tumour has been reached, the first thing to be considered is whether there is evidence of syphilis or not. In the former case anti-syphilitic treatment should be commenced at once. But even when there is strong reason to doubt the presence of syphilis in the case, it is well to give that treatment a fair trial. A few weeks will generally show whether improvement is going to take place or not. I have already said, in speaking of intracranial gummata, that treatment with iodide of potassium and mercury is not always completely successful, indeed in some cases the effect is only a very partial one. The same may be said of gummata within the spinal canal. So that in this case too you may fail in curing your patient. If the tumour is not syphilitic, or if, being syphilitic, treatment has not been successful, any other medicinal treatment can only be palliative.

Therefore in such a case as this you have to consider the prospects of an operation for the removal of the growth. But the cases are few in which an operation has been performed for the removal of a tumour from the spinal canal. Bruns,[1] in 1897, collected twenty cases from the literature. When Putnam Warren[2] wrote, towards the end of 1899, the list had risen to thirty-three. The operation will probably become a more frequent one as surgical skill and technique advance. The

[1] L. Bruns, "Die Geschwülste des Nervensystems," Berlin, 1897.

[2] Putnam and Warren, "The surgical treatment of tumours within the spinal canal," *American Journal of the Medical Sciences*, Oct. 1899.

results, though not very favourable, are better than one might *a priori* expect. Out of the thirty-three cases just referred to, seven appear to have been completely successful, and, speaking generally, it may be said that about one-half of the cases operated on are either cured or considerably relieved, and that in about one-third of the cases death has resulted from the operation or has been accelerated thereby.

But, in spite of this heavy mortality, it is evident that when antisyphilitic treatment has failed and when a localising diagnosis is possible and has been made, the operation of laminectomy for the removal of the tumour is to be recommended in this otherwise hopeless disease. The risks of the operation should be carefully and conscientiously laid before the patient, for you must remember that fixing the site of a tumour exactly is often very difficult, that a tumour lying on the ventral surface of the cord cannot be removed, and that its situation on the lateral aspect of the cord makes the operation an exceedingly difficult one. When the tumour lies in the substance of the cord its removal is impossible, that is, impossible without inflicting dangerous damage on the spinal tissue. And the diagnosis as between extra-medullary and intra-medullary tumour is always very difficult to arrive at, and sometimes cannot be made at all. Such symptoms as dissociated paralysis of sensation (the sense of temperature and that of pain being lost), persistent and bilateral, along with paralysis of the muscles of the upper extremities of the lower neuron type, accompanied by spastic paralysis of the legs, pointing as they do to the presence of a tumour in the centre of the cord, would contra-indicate surgical interference. But even if the tumour is so situated as to render its removal impossible, the operation of laminectomy will relieve the tension within the spinal canal. This appears to be sometimes very beneficial in the case of tumours which cannot be extirpated.

The last of the causes of compression of the spinal cord which I need to mention is tuberculous caries of the vertebral column. Pott's disease is unfortunately a common one, and its treatment requires care, attention, and the exercise of great patience both on your part and on that of the patient. The tuberculous focus is usually in the body of the vertebra, and

the caseous matter comes to press on the spinal membranes, and so to compress the cord. But the first results are due to interference with the vessels and lymphatics of the dura mater, an interference which leads to œdema of the tissues of the cord. After this has lasted for some time, and in many cases for a very long time, the tissues of the cord soften and break down. It need hardly be said that if treatment is to be effective in restoring the functions of the cord it must act when only œdema is present, and before this softening process occurs. The spinal symptoms of such cases, especially in the earlier stages, are largely those brought on by pressure on the upper motor neuron, namely, spastic paralysis of the limbs.

The treatment, so far as medicines are concerned, is that of tuberculous processes elsewhere. The administration of cod-liver oil should be persistent, and some preparation of iron should also be given, preferably, I think, the syrup of the iodide of iron. The food should be plentiful, nutritious and plainly cooked. So far as may be consistent with the other parts of the treatment, the patient should lie in the open air as much as possible.

Otherwise the main treatment is one of rest, the object being to prevent movement in the spine and to take off pressure from the focus of the tuberculous process.

These ends are best secured by confining the patient to bed for many months and securing immobility of the spine and relieving pressure by means of extension.

The easiest and, in my opinion, the best way to bring about the extension necessary in such cases is to place a leather band, properly padded, round the occiput, the lower jaw and the chin, to connect it behind each ear with straps which, passing up either side of the vertex, are attached to a square piece of wood sufficiently wide to keep the pressure of the straps off the sides of the head. To this square of wood is attached a cord which, passing over a pulley fastened to the head of the bed, supports at its other end the weight required for extension. If the head of the bed be raised on wooden blocks the lower part of the patient's body, tending to slip down, is sufficient to counterbalance the weight used in extending the head and upper part of the spine. If the caries is in the dorsal or lumbar regions of the spine, extension should also be applied by means

of straps passing under the axillæ. In the former case a weight of only a few pounds can be borne, in the latter the weight may be gradually raised to twenty pounds or more.

Such extension, to be effective, has to be maintained for many months, and during this long period the condition of the bladder must be sedulously watched, and the greatest care is necessary in nursing to avoid the occurrence of bed-sores. I have found it well to use, in such cases, a somewhat thin mattress, and to make its surface more truly a plane by laying beneath it a broad wooden board. This avoids the formation in the bed of a deep depression under the shoulders of the patient. Such a depression obviously interferes with proper extension in that it does not allow the weight of the lower body to tell fully and properly. After the extension has done its work, and the patient is recovering, it is well to apply a poro-plastic jacket or other similar support. This will keep up the immobility of the spine to a certain extent, and at the same time allow the patient to move about in the open air.

Treatment by extension is usually successful with children and in young adults, and I have seen wonderfully good results even in apparently unfavourable cases. I recall the case of a patient of this kind twenty-four years of age, who had caries in the lower dorsal region with well-marked pressure symptoms, some anæsthesia, spastic paraplegia, and greatly exaggerated deep reflexes. After about a year of constant extension she was so well that I sent her to the country and allowed her to go about in an ordinary way. Some months later she returned to report to me her progress. I found then that she had construed her orders somewhat more liberally than one would have thought of, and had been working off her animal spirits at many dances. This exercise, for which she had an inordinate affection, must have been beneficial, for she was then, and is now, in excellent health.

Of late years the old practice of sudden and forcible reduction of the spinal curvature has been revived by Calot. This method is not correct in theory and works badly in practice.

If extension fails, then our only resource is in the operation

of laminectomy, combined with scraping out, disinfecting and draining the tuberculous cavity. This operation, the introduction of which we owe largely to Victor Horsley, to whom great credit is due in this regard, is not as a rule a dangerous one. But the after-treatment is exceedingly tedious and troublesome, for if the body of a vertebra be diseased, then in removing the laminæ the surgeon takes away the remaining support of the vertebral arch, and may be conceived as separating the spinal column into two parts. Nevertheless the operation is one which is sometimes necessary, and that chiefly under three conditions: first, in cases in which the disease is high up in the spine and threatens to interfere with respiration; second, when there are signs of abscess formation and consequent increase of pressure and risk of infection of the cord; and third, when extension has failed to improve matters, and when at the same time there is no reason to believe that myelitis is present.

The site of the lesion and the condition of respiration afford sufficient guidance under the first of these headings. The presence of an abscess is difficult to ascertain when the disease affects the body of the vertebra, though easy when the lamina is its seat. Sudden increase in the paralytic symptoms along with a pyrexia which is not traceable to tubercular disease elsewhere, will suggest the formation of an abscess sufficiently to justify the performance of an operation.

Except in very special cases a full trial ought to be given to the treatment by extension before any operative measures are considered. If this treatment is going to succeed the patient will show improvement in two or three months. And in most cases such waiting does no appreciable harm, for the œdema of the cord produced by pressure may cause paraplegia for many months without doing any damage to the cord which cannot be recovered from.

Laminectomy should not be attempted in those cases in which there is evidence of active disease elsewhere. It need hardly be added that when the seat of the disease is in the lamina, the operation is fully justified and very advisable.

We have now considered the treatment of such diseases of

the upper motor neuron as are due to toxines, that of those which are due in some considerable measure at least to increase of pressure within the cavity of the cranium and the spinal canal. There remains for discussion one other prominent cause of such disease, namely, destruction from softening, the result of occlusion of a cerebral vessel. This may occur as the result of thrombosis or of embolism. An apoplectic attack arising from one or other of these two causes is not to be treated in the same way as one due to cerebral hæmorrhage. The diagnosis must therefore be carefully established before treatment can be safely or usefully directed.

When a cerebral vessel has become occluded neither venesection nor strong purgation should be thought of. The patient is to be kept at rest, the bladder attended to and the occurrence of bed-sores guarded against, in the manner previously described. Otherwise, the treatment depends on the state of the circulation. Alcohol is frequently needed, and it may be necessary to give digitalis or strophanthus. Strychnine may also be required, and sometimes nitro-glycerine or erythrol tetranitrate.

During recovery, massage and passive movements of the paralysed limbs will prevent fixation, and the application of a light splint to the hand and arm at night may keep the contraction from becoming severe. As time goes on the patient should be encouraged to make active movements. If there be much restlessness the bromides should be given, and even opium may be required. The administration of iodide of potassium may be of service in the later stages.

In cases of thrombosis in which a syphilitic endarteritis is the cause, vigorous antisyphilitic treatment has often a very striking curative effect.

In conclusion, a few words may be said as to the management of certain of the special symptoms which result from that descending degeneration of the upper motor neuron which is produced by the various lesions we have been considering.

The muscles involved are paralysed, and this paralysis is more or less complete according to the variety of the lesion in question, according to its severity and completeness, and

according to the part of the body which is affected. In cases in which the paralysis is not complete, when the disease has reached the chronic stage, a certain amount of mild gymnastic exercises do good, provided no undue fatigue results. The use of the "go-cart," for example, is very useful in some comparatively mild cases of myelitis, and in the same class of cases gentle massage will be of benefit. Where a certain amount of atrophy, from disuse or from involvement of the lower motor neuron, has occurred in muscles which still remain somewhat under the power of the Will, Faradism may be cautiously tried, say once daily for five minutes. This treatment is often a most useful one, but great care should be taken not to apply the current to such muscles as are in a spastic condition. An application of this kind would excite and increase their rigidity, and in a case of myelitis it might influence unfavourably the focus of disease in the cord.

But paralysis is not the only result of degeneration of the upper motor neuron. We have also to combat the contracture of the muscles, and the tendency to spasmodic reflex jerking which sometimes show themselves. These are very difficult to treat with success. In hemiplegia the tendency to contracture may be met to some extent at least by bathing the limb with hot water, and by gentle friction of the skin from below upwards. No strong massage of the muscles paralysed should be permitted, for this tends to increase the contracture. Passive movements should be made at least twice a day, and some good usually results from stimulation of the antagonistic muscles with the Faradic current. It is also advisable to apply a light splint to the arm and hand at night, as I have already told you.

In cases presenting the symptoms of lateral sclerosis the spasm and stiffness of the muscles is very difficult to deal with. This stiffness relaxes at once in a warm bath, but it returns in a very short time after the bath is over. Gentle friction and slow passive movements may be expected to produce good results, and in some cases gentle gymnastic exercise tends to give greater freedom to the muscular movements.

The most distressing of all this class of symptoms are the

spontaneous, or apparently spontaneous, jerkings of the limbs which occur in chronic myelitis. Some patients suffer much by reason of these, and unfortunately you will find that they are very difficult to control. As a rule drugs do not act well, but you may try full doses of bromide of potassium given along with the iodine salt. Atropine or hyoscine may also be tried. Warmth certainly tends to diminish these spasms, and you may sometimes observe how the spasmodic jerking increases when you remove the bed-clothes to examine the legs, and so allow the cold to act. A warm bath gives great relief, and when the condition is causing much distress it may be well to place the patient for some hours, or even for some days, in a permanent warm bath.

Tremor is another symptom liable to occur in such cases, and fitted to cause great discomfort to the patient. Frequently seen in alcoholism and in cases of metallic poisoning, it is there to be treated by the removal of the cause, after which the tremor usually ceases. The intention-tremor of disseminated sclerosis may sometimes be controlled by giving small doses of strychnine. Hyoscine would also in some cases diminish the tremor, but the advisability of giving that remedy in such cases is doubtful. When we come to talk of the treatment of locomotor ataxia I shall have a good deal to say as to the methodical re-education of such patients in the art of making co-ordinated movements. Treatment of a similar kind is to a certain extent available in disseminated sclerosis. You will remember that the tremor and oscillation in this disease increase in amplitude as the voluntary movement is being made. The patient should be instructed to practise such movements as he must frequently have to make in daily life, and to practise each movement many times in succession, performing it slowly and with every attempt at precision. In this way he may recover, to some extent at least, the power of making ordinary movements with steadiness.

We have now completed the consideration of the more important of these maladies which produce paralysis of the upper motor neuron. These have been taken as types, and from a consideration of the lines of treatment to be adopted in

them, it will not be difficult to see what the treatment should be in those less common disorders which have not been specially mentioned.

In the next lecture we shall consider the treatment of those diseases which are chiefly characterised by the phenomena of irritation of the upper motor neuron.

UTERINE RETRACTION WITH SPECIAL REFERENCE TO THE MECHANISM AND MANAGEMENT OF THE THIRD STAGE OF LABOUR

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THE question of the mechanism and management of the third stage of labour is at present in a curiously paradoxical position. The view that the placenta is separated in the main by an extreme diminution in area of the placental site is the popular one, and should have as its result the adoption of the Credé method of managing the third stage of labour. Practically, however, this method has been abandoned so far as the separation of the placenta is concerned, and an expectant plan adopted.

The view of placental separation advocated by me in papers read before this Society and the Royal Society of Edinburgh has not been generally accepted. I urged then that the separation took place after the "pain," and it thus followed that an expectant treatment during separation in the third stage of labour was best. This is the treatment usually followed by all, but the reason for it is disregarded.

Another curious point is that the study of actual uteri with the placenta partially separated or still attached has not hitherto cleared up matters but rather puzzled us all. For instance, the Porro uteri so carefully examined and beautifully figured by Barbour in his splendid monograph, left the advocates of placental separation from placental-site-diminution in this unsatisfactory position, that what they had expected did not happen; the placenta was still attached, although the area of the placental

site had shrunk from 17·5 × 17·5 cm. (end of pregnancy) to 10 × 10 cm., and the uterine wall thickened from 5 mm. to a uniform one of 37 mm.

Third stage uteri obtained by *post-mortem* examination, conveniently termed "intact third stage uteri," are even more disconcerting and perplexing to all. The curious point is that where the placenta is attached, the uterine wall is relatively thin as compared with the Porro uteri (5 mm. as to 37 mm.), showing retraction not well marked; while it is thicker on section where only membranes are attached, thicker still where the placenta has been in part separated, and thickest of all above the site of a uterine rupture.

We may sum this up by saying that the safe expectant treatment of the separation of the placenta in the third stage of labour depends on a generally rejected view of its mechanism, while the view of the management—deducible from the generally accepted mechanism—is now believed to be dangerous. Finally, if one accepts the Porro uteri as normal evidence of separation of the placenta, one cannot understand the "intact uteri."

For some years I have puzzled over these discrepancies, and as I now believe I have a feasible solution of the apparent anomalies, I wish to raise the whole question again. Of special material not yet published (with two exceptions), I have two valuable intact third stage uteri I owe to the great kindness of Sir Henry Littlejohn and Dr Harvey Littlejohn; one Porro uterus, two *post-mortem* Cæsarean section uteri, several pregnant uteri (third, fourth, and seventh month), several *post-partum* uteri, and of course the wealth of drawings of sectional anatomy of the pregnant and parturient uteri obstetricians are now so fortunate in possessing.

The first thing is to define uterine retraction. By this I understand that the uterine muscle, after a contraction or "pain" is over, retains in part the thickening of the contraction. Retraction, which thus includes contraction, is a property of the uterine muscle above the retraction ring of labour, and we can thus say that during labour the muscular wall above the "retraction ring" thickens, and gradually diminishes the capacity of the cavity it bounds; while all below the retraction ring, *i.e.* down to the os externum, thins relatively, and

the capacity of the space bounded above and below by these limits, increases. In a simple contraction, on the other hand, the thickening and shortening of the uterine muscle passes off after the stimulus causing it has ceased to act, and the muscle resumes the form it had prior to the contraction.

We have no means of directly determining clinically the amount of retraction during and immediately after labour. We have therefore to fall back on the sectional anatomy of uteri as displayed in the various stages of labour. We have no evidence that they give the actual thickening of a pain, or that the pain has been fixed by *rigor mortis*, but they do, I hold, exhibit evidence of uterine retraction. *Post-partum* uteri undoubtedly do and the others also, as they show a definite inequality of retraction, as we shall see presently.

In studying and tabulating this evidence we take the various sections of the pregnant parturient and *post-partum* uteri and measure the average thickness (1) of the uterine wall at the placental site and (2) of the site of the membrane attachment. Two measurements of each are taken, and the half gives a fair value (Fig. 1).

I take first the pregnant parturient (first and second stages), intact third stage and *post-partum* uteri. The Porro uteri I reserve for special consideration.

These measurements I have plotted out in a curve, one showing them in normal labour, and the other where we take the Porro uteri in place of the intact third stage uteri. In the first the result of retraction is little marked until the immediate post-partum stage, when it is very evident, uniform and symmetrical. In the second curve involving the Porro uteri, we get marked third stage retraction. The retraction where the placenta is not attached is always marked, *i.e.* the uterine wall is thicker.

The question now arises as to what we can deduce from the thickness of the uterine wall or section at the placental site as to the placental area. We may state this broadly as follows. There is a relation between the thickness of the uterine wall and the area of the placental site such that increase or diminution in the one means a reduction or increase in the other. Thus a 5 mm. thick uterine wall means approximately a 175 sq. cm. placental site, a 22 mm. thick uterine wall means

approximately a 10 × 10 cm. placental site, and so on. This of course follows from the elementary fact that if we take a definite length of uterine wall on section bounding a definite rectilinear area of placental site, the product of the thickness of the wall into the breadth and length of this area will give the cubic content. If we imagine this definitely mapped out portion to retract, then the thickening of the uterine wall must be accompanied by a definite diminution in the other diameters so as to keep the cubic content constant. We may accept, therefore, the thickness of the uterine wall at the placental site as giving an index to the diameters of the placental site.

The second curve differs from the first, inasmuch as the Porro uterus shows an amount of retraction greatly exceeding that of the third stage intact uteri, and nearly equal to that of

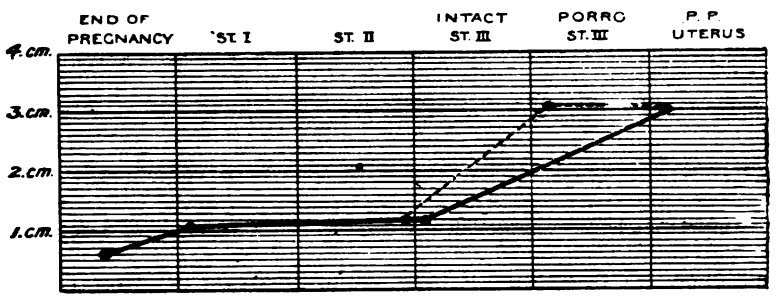

FIG. 1.—THE LOWER BLACK LINE SHOWS THE THICKENING AND RETRACTION AT THE VARIOUS STAGES OF LABOUR IN A NORMAL CASE. THE DOTTED LINE SHOWS THE THIRD STAGE RETRACTION IN PORRO CASE.

the *post-partum* uterus of the first day. It seems to me, therefore, that a cardinal mistake has been made in considering the amount of retraction of the Porro uterus as indicating the retraction necessary in the normal third stage uterus, and an equal mistake in demanding a more marked retraction than that of the Porro uterus for the separation of the placenta. The Porro uterus is a pathologically retracted uterus, as the mesial incision allows the circular fibres to retract unduly, while the amputating stroke permits a like undue retraction to the longitudinal fibres.

Champneys and Sänger have also drawn attention to the unnatural conditions of the Porro uteri, and Sänger held that its retraction is hindered.

I defer till afterwards the statement of what we can deduce from the Porro uteri as to placental separation.

In Fig. 2 we see that the thickness of the uterine wall in parturient uteri is always less at the placental site where the placenta is unseparated than where the placenta is not attached. This may mean two things. It may mean that during a pain the placental site contracts less markedly than the rest of the uterine wall, or that it retains ultimately less of the contraction than the rest. In the former case we would, as Dr T. D. Slight has pointed out to me, expect a stretching of the placental site owing to the preponderating muscular action of the uterus apart from the placental site. There is no

FIG. 2. INTACT THIRD STAGE UTERUS WITH PLACENTA UNSEPARATED.

evidence of this, and Schroeder and Stratz' section of an early stage of labour shows undoubted diminution in the placental site. The second explanation seems to me more probable, and one that does not go beyond the anatomical facts. Professor Stephenson of Aberdeen has drawn attention to this inequality of section of the wall in the third stage intact uteri in an interesting paper. He defines retraction as meaning "greater resistance to expansion" (p. 22), and believes that the layers of the muscular wall act differently, the external contracting and retracting regularly, the inner behaving irregularly (p. 24).

By the researches of Duncker especially, and of Poroschin, it has been shown that absence of the elastic tissue of the uterine wall is a factor in determining uterine rupture. Normally there exists a well developed network of elastic tissue in the uterine wall which surrounds the superficial muscles of the uterus. In the puerperal uterus the fibres are

better marked, and the lower uterine segment and cervix are richer in elastic tissue than the body and fundus.

I do not consider at present the effect of deficiency of this tissue in favouring uterine rupture, but merely point out that its reaction after the compression of the "pain" must aid in the recovery of muscle form.

The facts I have stated, and the newer ones brought forward, seem to me to strengthen the position I already took up, viz., that separation of the placenta takes place after, and not during a pain. The process of separation during the third stage of labour seems to me, therefore, to be effected as follows. We must first consider the effects of the "pains" on the placenta in the first and second stages of labour. The result of a pain in these stages is during the persistence to diminish the area of the placenta, to thicken it, and to thicken the uterine wall. This is undoubted. When the pain ceases, we get the uterine wall retaining part of its thickening and probably retaining less at the placental site. The placenta increases in area again, and diminishes its thickness. The placenta does not separate, as practically in these stages the wall and placenta behave as one. When the pain dies off, the fœtal and maternal circulation pass back into their channels, and with the elastic tissue reacting after compression, we get the "elastic recoil" after a pain by which the uterus tends to resume its old form. The placenta does not separate. To effect separation, *i.e.* to tear the filaments at the spongy layer connecting the placenta to the uterine wall, or, in other words, connecting the placental site (uterine) with the uterine surface of the placenta as seen after delivery, we require a disproportion. So long as placental site and placental area are equivalent in area, separation cannot happen. For separation, diminution in the placental site is not requisite in itself, but because it permits of an after disproportion. A very slight disproportion is necessary, as the filaments are microscopic, and easily tear under such a condition. This disproportion does not happen in the first and second stages of labour as uterus and placenta behave as one.

During the third stage we get "pains" as usual, and we may now trace their effect. The first pain, for example, will compress the placenta and diminish it in area. The placental area and its uterine site are, however, equivalent and the muscular

wall thickened. When the stimulus causing the pain ceases, we get the "elastic recoil" after the pain due to the elastic tissue asserting itself after compression, and to the passage back in part of the maternal circulation into the uterine wall. Thus the placental site increases, but is not followed up by the placenta, as the influence of the fœtal heart has been cut off and we thus get the necessary disproportion of separation, and the placenta separates in part. Repetition of the pains and the elastic recoil complete the separation of placenta and membranes, and finally, the uterus expels the membranes and placenta either with the placental edge presenting (Duncan), or the amniotic surface first (Schultze). What I have termed "elastic recoil" has usually been spoken of by the obstetrician as "relaxation" and regarded as favouring hæmorrhage. It does not, unless excessive, as we all know that after a pain the uterus softens and yet bleeding need not occur.

When this elastic recoil occurs, there is really a gliding of the internal surface of the uterine walls and no separation of the walls. It has been argued that there is not sufficient energy during the elastic recoil to separate the placenta; but when we remember how easily these filaments are torn through in the early stages of placenta prævia, when only insignificant pains are present, this difficulty disappears.

The Porro uteri seem to me definitely to determine one thing, viz., that diminution of the placental site does not separate the placenta. Porro uteri are over-retracted uteri, and yet the placenta is usually attached (Fig. 3).

There have been four great methods of treatment of the third stage of labour—traction on the cord, the Dublin method, the Credé method, and the expectant plan. Although I give the fourth method the last place, it does not follow that it is a recent method, as Wm. Hunter advocated it. I consider these methods only as far as separation is concerned. Separation is the great thing to clear up. Expulsion of a separated placenta is easily understood.

Traction on the cord is now abandoned, and rightly so.

So far as I have read the directions of the eminent Irish obstetricians concerned in the development of the Dublin procedure, Dease (1783), Collins (1835), M'Lintock (1848), and others, I have been impressed with the fact that pressure on

the uterus is not recommended to be applied until some time has elapsed, and in this fact lies its safety and efficiency.

The original Credé method recommended expression to be begun immediately after the birth of the child. Herein lies its danger. Expression to separate the placenta is bad; to expel the placenta when separated, it is admirable.

I therefore advise the well-known expectant plan in the normal third stage, viz., that the attendant keep his hand on the uterus and allow it to separate the placenta during its elastic recoil, and that expression should only be used to expel the separated placenta, the separation usually occurring in from twenty to forty-five minutes. I need not give fuller details, as I have already indicated these in previous papers. I wish to urge, however, that all unnecessary manipulation of the uterus should be avoided, so as to ensure that it is not exhausted, and thus made inert.

FIG. 3.—PORRO UTERUS—PLACENTA SEPARATED IN PART.

I may now finally sum up my views as follows:—

1. The Porro uterus is an over-retracted uterus, and does not indicate the amount of retraction of the normal third stage uterus during retraction.

2. The "intact uterus" is not so markedly retracted as the Porro uterus at the site of the unseparated placenta, and gives a more reliable indication of the amount of retraction under normal third stage conditions.

3. Retraction of the uterus is most marked in the parturient uterus where the membranes are attached; above the site of uterine rupture, and in the *post-partum* uterus. Placenta and membranes attachment hinder full retraction.

4. The placenta is separated in the third stage during the elastic recoil of the uterus following a pain, and not during a pain.

5. No uterine pressure can separate the placenta directly with safety.

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NOTES ON BLACKWATER FEVER IN SOUTHERN NIGERIA

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ACCORDING to the older residents in this part of the West Coast of Africa, blackwater fever appeared first in 1886; but it is extremely probable, from descriptions of cases, that it occurred occasionally many years before that date, and was diagnosed as "yellow fever" or "bilious remittent with jaundice." There seems to be no doubt, however, that the disease is much more frequently met with nowadays than

formerly, and that it varies very much in severity in different years. In one season a dozen cases will occur consecutively without a death, and in another the death-rate may be as high as 20 or 40 per cent. of the cases treated.

Its ætiology is unknown, though the fact that the majority of cases occur between the second and fifth years of residence, and usually in those who have suffered from many attacks of malarial fever in the past and are in consequence more or less anæmic, has led to the theory that it is of malarial origin. It must still remain, however, an open question, whether the disease is to be regarded as a direct consequence of hæmamœbiasis or not. We have met with several cases in patients who have taken very little quinine, and since extracts from Koch's communication have been published in the lay papers, many people have been frightened out of using the drug as a prophylactic altogether, without any diminution in the number of cases of blackwater fever.

In the great majority of cases there is no history which throws any light on the predisposing cause, though exposure, in a certain number of cases, appears to have been the exciting cause of the attack. Although it is true that the majority of cases occur in patients who have lived from two to five years on the coast, nothing really definite can be said on this point, and there is apparently no question of individual immunity. Thus, cases have been met with of newcomers contracting the disease after only a few months' residence, and on the other hand, of men who have lived for many years in the country, and have then suffered from the most dangerous and fatal type.

As far as we can judge from the statistics of Southern Nigeria, there is a well-marked connection between the particular season of the year and the number of cases of blackwater fever recorded. Curiously enough, this connection is in direct opposition to that which obtains in the German Cameroon Colony—the headquarters of which is distant but a few miles from Old Calabar. F. Plehn, in his monograph on the diseases of the Cameroons, distinctly states, that from the beginning of the rains in March, to their termination in November, the number of blackwater fever cases steadily grows, to fall suddenly at the onset of the dry season. Now the seasons in Southern Nigeria are practically the same as in Cameroons,

and yet the cases of blackwater fever met with here are much more common in the dry season, and only an occasional case occurs in the rains.

There seems to be no doubt, that the coloured races enjoy in the Protectorate, the same immunity from blackwater fever, that has been observed in other districts of the West Coast. Since the time when Government statistics were first instituted, no case has been recorded in a native.

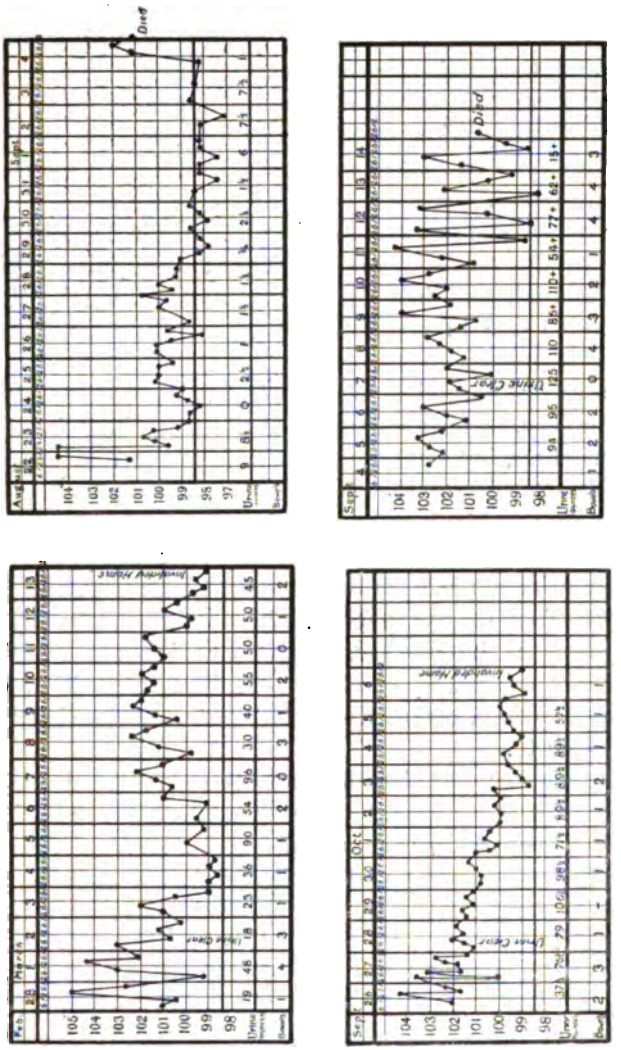
It is impossible to judge of the part played by sex in the determination of the liability to this disease, the relatively small number of European women resident here, as well as the conditions under which they live, precluding the possibility of drawing any conclusion on this point.

Finally it may be stated with confidence, that exposure, and alcoholic or other excesses, frequently pave the way to an attack, though even here, no definite connection can be found between cause and effect.

Symptoms.—The disease is, as a rule, ushered in by a sharp rigor, which does not differ in any way from the ordinary ague fit. The patient may have been in perfect health up to the onset of the attack, though in a certain percentage of cases there is a history of one or two slight fevers, immediately before the blackwater fever commences. He finds, on passing water, that his urine is the colour of porter, and at first usually scanty in amount. The temperature rises to 104° or 105° and then falls more or less rapidly, the skin and conjunctivæ become rapidly jaundiced, and vomiting of a most persistent and distressing character sets in. The general condition of the patient becomes rapidly more serious, and in a bad case, in twelve hours he can hardly lift his head from the pillow. The initial rigor may be followed by others during the first twelve hours, though in the majority of cases there is only one, followed by a sharp rise and gradual fall to about 101° or lower.

It is impossible to lay down any definite type of temperature curve; many cases fall to normal about the third day, and then a secondary rise takes place which lasts about a week. In another class of cases there is a tendency to hyperpyrexia which is often fatal, and in others there is a gradual fall from the first, the temperature reaching the normal point only as the patient is convalescent.

The urine generally clears up on or about the third day of the disease, often very rapidly, becoming free from hæmoglobin in six hours after it has commenced to get lighter in colour.



CHARTS ILLUSTRATING VARIETIES OF TEMPERATURE IN CASES OF BLACKWATER FEVER.

It is of the same character from the first rigor to the time when it begins to clear, being acid, 1016 to 1025, the colour of porter, with a brown froth, and there is deposited slowly on standing a copious brown sediment consisting of blood and

granular casts, epithelium, granular debris, and a few red blood corpuscles. In amount it varies enormously, there being polyuria in a considerable number of cases, over 100 ozs. being passed in the twenty-four hours in some instances, while in other cases the quantity becomes gradually smaller until suppression sets in and the patient succumbs. There is often a partial suppression on the second day, which is of no serious import. The act of micturition often causes intense pain during the first few hours in bad cases, and the first specimen may contain much pure blood.

The pulse becomes rapid and tense early in the disease, and the respirations shallow and frequent; the pulse-respiration ratio is altered, and instead of four to one may be three or even two to one in severe attacks, and an early distressing symptom is breathlessness.

The liver is normal in size as a rule.

The spleen, in most of the cases met with here, is enlarged, though whether, in a country where nearly everyone has suffered more or less from malaria, this can be taken into consideration as a symptom of blackwater fever, is open to doubt.

The mental condition is one of anxiety; and constant restlessness and insomnia, with the persistent vomiting, add greatly to the distress of the patient. The mind is usually clear, though late in the disease, in cases which are running an unfavourable course, the patient falls into a condition of low muttering delirium, out of which he appears to partially awake when spoken to.

In cases of suppression of urine, even when very prolonged, we have never seen either coma or convulsions, and in fatal cases death apparently occurs from exhaustion.

The general condition after the first three days is that of profound anæmia caused by severe hæmorrhage, and recovery is very slow.

The treatment which we have usually adopted has been as follows:—

A large dose of calomel is given at the commencement of the attack, followed in six or eight hours by a saline, repeated if necessary until free purgation occurs; the patient is then put on a mixture containing sod. salicyl. and sod. bicarb., taken every four hours. Free stimulation is resorted to early,

as the strength rapidly fails. Frequent feeding is of the utmost importance, and if food cannot be retained by the stomach, rectal injections and suppositories should be used from the beginning. The vomiting may be combated by chloroform, acid. phosph. dil., sinapisms, and the usual methods, and the insomnia is best treated by bromides, though all attempts at treatment of these symptoms often fail. Digitalis and strychnine should be freely given if cardiac failure threatens; and if the patient recovers, he should be sent at once to a temperate climate.

We are strongly of opinion, after an experience of the treatment of this disease, extending over a period of nearly eight years, that no one who has once suffered from blackwater fever should ever be allowed to return to West Africa. Recurrence is the rule; and although an individual may survive many attacks, the disease invariably kills in the end.

ABDOMINAL CASES[1]

By J. SCOTT RIDDELL, C.M., M.B., M.A.,
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THE conditions in the abdomen which require surgical interference are so varied, and the variations from the ordinary type of any given disease are so numerous, that there needs must, among a fair number of cases, be some of special interest, arising from difficulties of diagnosis and of treatment. A description of ordinary uncomplicated laparotomies would be tedious and trite. Specially selected cases may, however, present features of interest to the members of the Society, and elicit discussion and an interchange of opinion, which is always beneficial. I have, therefore, from fifty abdominal sections, performed last year in private and hospital practice, selected cases which serve to show the difficulties that confront the diagnostician and the operator. The cases have been grouped together, and any deductions to be drawn from the clinical features or the operative methods have been shortly noted. I have brought for your inspection a number of specimens and diagrams illustrative of these points.

[1] Read before the Aberdeen Medico-Chirurgical Society.

Taking the more common operations first, I begin with *Ovariotomies*, from which I select my last three as worthy of notice :—

Case I.—*Sarcoma of Ovary: Twisted Pedicle: Adhesions.*

Mrs M., aged 49, was sent to me by Dr Mitchell, New Deer. He noticed a year ago a small swelling on the right side of the pelvis which, on vaginal examination, he found to be an enlarged ovary. The tumour steadily increased in size until it could be palpated from above as a firm swelling the size of a large cocoanut. On examination it was found to be solid, fairly firmly attached to the broad ligament, and painful on movement. Two days after admission the patient had an attack of peritonitis, localised in the neighbourhood of the tumour. This lasted for four days, and left the tumour much less movable than before from adhesions to the abdominal parietes. It was diagnosed as fibroma of the ovary, with adhesions due to recent localised peritonitis.

On abdominal section the parietal peritoneum had to be skinned off the tumour, which was thereafter easily removed, the pedicle being found twisted on itself three times. The recovery of the patient was uneventful.

The pathologist's report showed the tumour to be a sarcoma of the ovary—rather a rare condition, except in very young patients. It is possible, I think, judging from the history and slow growth, that the tumour may have been a connective tissue one to begin with, which had, later on, become sarcomatous. Sarcoma of the ovary is characterised by very rapid growth, and the presence of ascitic fluid, neither of which conditions obtained here.

Case II.—*Double Ovarian Tumour: Right—Large and Solid; Left—Intraligamentary: Ovariotomy: Drainage of Left Broad Ligament.*

Miss R., aged 59, a nurse at the Royal Asylum, Aberdeen, was sent for operation. The tumour had been once tapped before she came. A large firm mass, extending up below the ribs, was felt on the right side, while the notes show that a

line of demarcation was noticeable between it and the large fluid swelling which filled the left side of the abdomen, and extended deeply into the pelvis between the layers of the left broad ligament. Vaginal and rectal examination showed the tumour to he firmly fixed in the pelvis, and a diagnosis was made of an intraligamentary cyst, or of one of large size with very firm pelvic adhesions.

On opening the abdomen the left tumour, which was fluid, bulged into the wound, and the right one could not be removed without first aspirating the left, a sample of the contents of which I hand round. The right tumour was then removed after enlarging the abdominal incision and ligaturing its pedicle, which was fairly broad. The left tumour was then evacuated as far as possible of its contents, and with considerable difficulty dissected out from between the layers of the broad ligament. The large cavity so left presented numerous bleeding points which required ligature, while adhesions at the front and sides of the abdomen required similar treatment. The space between the layers of the left broad ligament was diminished by cutting off part of the edges, which were then brought up and sutured to the parietal peritoneum by a narrow neck, into which a large Keith's drain was placed reaching down to the bottom of the cavity. The pelvis outside this was also drained by a sterile gauze pack brought out behind the Keith's tube. The latter was removed on the second day, the glass drain on the fourth being replaced by iodoform gauze. The abdominal wound and the broad ligament cavity healed up very kindly, and the patient left hospital five weeks after her operation.

The case was very similar to one I had last year, where the cyst was a large right intraligamentary one, complicated with myoma uteri and left pyosalpinx. In this case the tumour, uterus, tubes and ovaries were removed by supravaginal amputation of the uterus, and the pedicle treated extraperitoneally with excellent result.

Case III.—*Suppurating Dermoid: Twisted Pedicle: Dense Adhesions: Ovariotomy.*

Mrs W., aged 28, was sent by Dr Cowie, Turriff, for cœliotomy. Six months previously, after a miscarriage, the

tumour which I show you was felt on the right side of the abdomen. It felt fairly firmly fixed to the abdominal wall, and apparently equally so in the pelvis. Examination showed the uterus to be distinct from the tumour, and lying on its left front. At the operation the parietal peritoneum on front and sides was found to be much thickened and very adherent to the tumour, from part of which it was impossible to dissect it off. The tumour was first disengaged at its lower part, where you will observe two smaller cysts, and a narrow pedicle thrice twisted on itself was ligatured. In attempting to detach the upper part some of the contents, which were undoubtedly purulent, escaped into the abdomen. The upper part of the tumour was with some difficulty detached from the abdominal wall, and cut off from omentum and bowel, to which it was fixed by strong fibrous adhesions evidently of some standing. The abdomen was washed out with sterilized water, and drained with a Keith's glass tube which was removed on the third day. There is still a small superficial sinus in the abdominal wound, but the patient has otherwise made an uneventful recovery.

Tubal Cases.—A number of tubal cases show nothing of interest except the firm adhesions to bowel, uterus and omentum which have been experienced, and readily dealt with when the patient is in the Trendelenburg position.

Hysteropexy has been done in five cases for malposition of uterus complicated with tubal disease or pelvic adhesions. The method used has been to anteflex the womb and suture it to the parietal peritoneum by two silk stitches passed at the upper and posterior part of the uterus, according to the plan of Howard A. Kelly. What has struck me most in connection with these cases has been the great discomfort and chronic invalidism caused by these malpositions, and the great relief secured by this simple operation. Where hysteropexy is done for prolapse, a preliminary perinæorraphy has been performed.

Case of Needle removed from Abdomen Six Months after it had been swallowed.

Miss N., aged 22, had been for some time an inmate of the Royal Asylum, and while there had swallowed a needle. She complained after her dismissal from that institution of great pain and abdominal discomfort, and was sent to me by Dr

Crevie, Foveran. A skiagram by Dr Levack showed the needle to be at a considerable depth within the abdominal cavity. A hard mass about the size of an orange, but flattened antero-posteriorly, could be felt just above and to the right of the umbilicus. It seemed to be attached to the parietal peritoneum, though at first not very firmly. It was decided to watch the case, and not to interfere for some time unless urgent symptoms supervened. While the girl rested in bed there was little pain, though pain was always caused by handling the tumour. Gradually the tumour came nearer to the surface, until at one part it felt almost subcutaneous. Localisation by the M'Kenzie-Davidson instrument fixed the eye end of the needle at $\frac{1}{2}''$ distance from the skin, while the other end was at a depth of $1\frac{1}{2}''$. Dr Levack was able to tell me the exact length and direction of the needle, and his measurements were found to be correct in every particular. The skiagram showed the needle lying to the right of the umbilicus. An incision was made at right angles to its course into dense inflammatory tissue, from which the needle was removed. The needle had undoubtedly pierced the stomach or intestine, been surrounded by inflammatory deposits, and gradually worked its way to the surface.

Some years ago I had a somewhat similar case, where an ordinary pin encrusted with fæces was removed from a peri-appendicular abscess in a fisherman who was unaware of having swallowed any foreign body.

The case is an interesting one, not only from the course it ran, but for the reason that had there been no history of the ingestion of a needle the tumour would have been very difficult of diagnosis, and even with such a history the finding of the needle might not have been easy unless aided by Dr Levack's localisation.

Abdominal Abscess containing Bristles from Brush, Egg Shells and Orange Skins: Fæcal Fistula resulting.

Dr Mitchell, Old Aberdeen, sent for operation a boy aged 10, with a large abdominal swelling. The patient had been seen previously by other medical men, and various diagnosis had been come to, including that of tumour of the liver. The case had a history of several months' duration. The abdomen

was found to contain a large swelling extending from just under the liver to below the umbilicus, occupying more than half of the abdomen on the right side. The tumour did not move on respiration. The boy was wasted and looked tubercular. The temperature was mainly hectic, but occasionally for two or three days at a time would remain normal. He had a good deal of pain on admission, but with rest and dieting, and the application of a large emplastrum hydrargyri his condition became tolerable except for the temperature. After frequent examinations, and full consideration of his case to the exclusion of liver tumour, sub-hepatic abscess, and other conditions which might cause swelling in this region, I came to the probability diagnosis of tubercular peritonitis with encysted fluid in the right upper half of the abdomen. Free fluid could also be made out in the lower half of the abdomen, which seemed to corroborate the diagnosis, as also did the appearance of the patient and the history of the case. Rectal examination revealed nothing. On opening the abdomen at the lower part of the tumour, entry was made into a large abscess cavity which contained a large quantity of foul-smelling pus. The cavity extended right up below the liver, and was drained there posteriorly by a counter opening. In irrigating out the cavity my finger was pricked by sharpish bodies which turned out to be strong hair bristles from a brush. Thirty or forty of these were removed along with several pieces of egg shell and two pieces of orange skin. The rest of the abdomen was shut off by dense peritoneal adhesions. The boy was greatly relieved by the operation, but suffers from a fecal fistula, the opening in the bowel through which these bodies had ulcerated [illegible] abscess. The fistula is in the colon towards the hepatic flexure as is found by giving enemata of boric [illegible] the abscess cavity. Every two days [illegible] the boy has a free motion per rectum. Further operation [illegible] necessary to close the fecal [illegible] the opening of the abscess cavity which is [illegible]

[illegible] case for cholelithiasis. [illegible] Aberdeen, [illegible] and the gall-stones [illegible] The gall-bladder opening was sutured to

parietal peritoneum and muscle, and the wound was firmly healed in a month's time. The last case of the kind I had, was one sent by Professor Finlay, for which 186 stones similar in composition were successfully removed.

Cases of Nephrectomy, Nephrotomy, and Nephropexy, show no divergence from the ordinary type, and no special points of interest to detain us.

Appendix Cases.

The opinions which I expressed in the paper which I had the honour of reading before this Society a year ago, have been strengthened by my experience since then.

It was stated then that the appendix was in considerably over ninety per cent. of the cases the cause of so-called perityphlitis, while stercoral ulcer and typhlitis *per se* were exceedingly rare conditions. The point on which special stress was laid, and on which there was some discussion, was the treatment of appendicitis by operation, and the "when" and "how" of the operation. About suppurative and perforative appendicitis, there can be no divergence of opinion. The question as to when appendicitis could be called "chronic," "relapsing" or "recurrent" was disputed. Several practitioners of large and ripe experience stated in this room that they had never seen a case requiring operation. Certainly over fifty per cent. of cases have only one attack and do not require operation. The risk of a second attack is as great as that of enteric fever. A patient with recurrent appendicitis is, after his second attack, living on a mine, for the risk of suppuration or perforation is great. The rule I have always gone by, is to operate after a second attack during the quiescent period, and I have found no reason to change it. Since our discussion here last year, I have operated on eleven such cases, and in every one of them the appendix has been found extensively diseased and usually adherent. Two other cases were sent for operation which was disadvised, as the history and present condition did not seem to warrant interference. One patient sent by Dr Robertson, Lerwick, and waiting operation at present, has a history of hæmorrhage from the bowel attending on two severe attacks of appendicitis. I was inclined at first to think

that this might be an instance of stercoral ulcer as the cause, but the discovery of a rectal polypus has led me to place the case in a line with the others.

Suppurative Appendicitis and Perforative Appendicitis.

Several cases of surgical interest have required operation, but want of time precludes a description of them.

Cases of Intestinal Obstruction.

CASE I.—*Strangulation by Band: Recovery.*

Mrs Arnott, aged twenty-three, was seen with Dr Ogston, who had diagnosed Intestinal Obstruction. The abdomen was fairly well distended, and there was a painful area in the region of the umbilicus. Vomiting had not been severe, and patient's general condition was good. She was removed to the Infirmary. Between her admission and the time of my visit, fæcal vomiting had occurred twice, and I decided to operate immediately. An examination after the peritoneal cavity was open, revealed a swelling in the right flank which was found to consist of a coil of bowel tightly constricted by a band of peritoneum which was released and dissected off, the operation from beginning to end taking twenty-five minutes. The obstructive symptoms immediately disappeared and the patient made an uninterrupted recovery.

Very different, however, is the history of two other cases, both seen several days after the onset of obstruction, and both operated on, as is unfortunately too often the case, as a "last resource." In the first case, the patient—a young girl—was greatly collapsed, and obstruction was found to be due to general peritonitis with matting together of the intestines.

The other case showed distended small intestine coming close up to the cæcum, the junction of the distended and collapsed part of the ileum being constricted and greatly congested, apparently by a band which attached the bowel to the parietes. The intestine was opened, drained and sutured.

Cases of Gangrenous Intussusception.

An infant of eight months was sent with a history of having been six days ill with abdominal pain, vomiting and obstruction.

Blood-stained mucus had been passed. A sausage-shaped swelling could be felt in the abdomen, and could be easily examined bimanually with the right index finger in the rectum. There was no difficulty in diagnosing intussusception, but of six days' standing, and therefore to all intents hopeless in a child of this age. No attempt at reduction could be made, as the bowel was sure to be firmly fixed and probably gangrenous. The child's temperature was 102·2°. The only chance lay in abdominal section and removal of the intussuscepted portion, preferably by Barker's operation, if found suitable for the case. On opening the abdomen the intussusception was found to be of the ileo-cæcal variety, the cæcum lying over on the left side and inside the upper part of the sigmoid flexure. Barker's operation was impossible; 11½ inches of the colon were removed and the end of the ileum and descending colon brought out in the abdominal wound. The child died six hours after operation.

I had a similar case last year, when I was asked to see an infant ten months old, which had been ill for four days and had not been seen by a medical man. Child's temperature 104°. An intussusception could be easily palpated. It was brought to the Infirmary for operation, and the sister in charge had, before my arrival, given an enema. On examination the tumour, which could be distinctly felt before in the sigmoid flexure, had disappeared. The child's temperature had come down to normal. Though on the operating table, under the circumstances delay seemed advisable; no further symptoms showed themselves, but the child died early the next forenoon before the visit hour. A *post-mortem* examination showed a condition exactly similar to the last—a gangrenous ileo-cæcal intussusception.

From these cases and similar ones which I have had, I am inclined to think that obstruction cases come to us as a rule much too late for successful operative interference. Had the two intussusception cases I have described been seen within the first twelve to twenty-four hours, there is every reason to believe that they could have been successfully dealt with by operation. The blame of delay is often due to patients and patients' friends, but I am afraid we are inclined to temporise too much in these cases. It is hard to have to advise a young man

after a few hours' illness to submit to a dangerous operation. His request for a few hours' respite are listened to, and he comes to the operating table in a collapsed and hopeless condition. Intestinal obstruction is as much a surgical disease as strangulated hernia, only much more dangerous, for a recovery may take place in the latter from gangrene and fæcal fistula. Though every case of acute intestinal obstruction dies if not relieved by operation, there is still too great a tendency to call in surgical aid as a last instead of a first resource. A great proportion of these cases can be saved if operation be performed before the abdomen is much distended, before urgent fæcal vomiting and collapse with general peritonitis and paretic distension of the bowels supervenes.

As Treves says: "The worst feature of all in the management of cases of acute intestinal obstruction is delay. Operation may be dangerous, and is indeed very dangerous, but delay is worse. The one perpetually reiterated comment upon fatal cases of laparotomy performed for acute obstruction is this, 'The operation was performed too late.' There can be no purpose in delay. The expectant treatment has had a very extended and very deadly trial in the past, and the age for miracles is past."

Or as Greig Smith equally forcibly put it: "At once or within a few hours we ought to make a definite diagnosis. If we are convinced that it is acute obstruction the operation should be performed *at once*; if we are convinced that it is not, another treatment equally definite ought to be pursued. From the beginning a definite plan of treatment should be laid down, and this plan should be adhered to. Let it be either drugs or operation, and never that fatal compromise operation when drugs fail."

A CASE OF ERYTHEMA MULTIFORME, CLOSELY RESEMBLING SMALL-POX

By NORMAN WALKER, M.D., F.R.C.P.Ed.,
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The more immediate interest in this case lies in the fact that it occurred during the present small-pox "scare," and that its diagnosis presented serious difficulties to two whose experience of small-pox is considerable.

About a fortnight ago I was asked by Dr Haultain to see J. G., a monthly nurse in attendance on a lady who had been delivered a week previously, on account of a rash on her face and hands, which he thought so suggestive of small-pox as to require a pronounced opinion.

The rash had first been observed about thirty-six hours previously, having commenced on the face with erythematous swelling, so great as to partially close one eye. It was most prominent on the cheeks, around the nose, and on the chin; the forehead was comparatively free, and there were no spots on the scalp. The lesions were various. There were minute bullæ filled with clear serum and other larger, flatter erythematous lesions, some showing evidence of a ruptured bulla in their centres. There was a little erythematous patch on the front of the neck and a single papule on the back.

So far there was nothing in the eruption to seriously suggest small-pox.

On the hands, however, the case was different. Instead of taking the ordinary ringed (Iris) form, each lesion commenced as a stony hard papule, and the likeness to small-pox was further increased by the presence in the centre of some of a small amount of exudation, which in artificial light (it was nearly midnight) looked not unlike commencing umbilication.

The condition of the hands is well shown in the accompanying photograph, which was kindly taken for me next day by my friend Mr Jones.

The history of the case was altogether against small-pox. The patient had been vaccinated a fortnight previously, and a large scab testified to the efficacy of the inoculation. She had had no rigor, no dorsal pain, no sickness. The temperature was sub-normal, and except for a slight feeling of malaise and the discomfort attendant on the rash she was perfectly well.

There was a vague personal history of rheumatism, and a definite account of recurring attacks of erythema iris in a cousin.

After consideration I expressed the opinion that it was not a case of small-pox, but that in the circumstances it was only right that the final decision in such a doubtful case should rest with the health authorities.

When Dr Harvey Littlejohn arrived we again considered the case in all its aspects, and agreed that the diagnosis of small-pox could be negatived. On a further consultation the following morning, when no further spots had appeared, and the patient's temperature was still sub-normal, the matter was made quite certain, and under a simple dusting powder and ten grains of aspirin every six hours the eruption rapidly disappeared.

I can find no record of any case where the diagnosis between these two diseases was so difficult. In the very large collection of atlases of skin diseases in the College of Physicians library, there is no illustration of any variety of erythema multiforme which resembled the case, nor have I discovered in any of the text-books any suggestion that the difficulty could ever arise.

It is no doubt true that the presence of small-pox in the city made one specially critical, but the feeling of the spots on the back of the hands was so—I had almost said—characteristic, that the possibility of modified small-pox would under any circumstances have had to be most seriously considered.

Recent Literature

CRITICAL SUMMARIES AND ABSTRACTS

MEDICINE

THE VOLUME AND OXYGEN CAPACITY OF THE BLOOD IN ANÆMIA

By G. LOVELL GULLAND, M.A., B.Sc., M.D., F.R.C.P.Ed.,
Assistant Physician to the Royal Infirmary, Edinburgh

ONE of the greatest hindrances to the development of our knowledge of the exact pathology of diseased conditions of the blood, has been the fact that we have had no reliable method of estimating the total amount of hæmoglobin in the blood, the total quantity of blood in the body, nor its relation to body-weight. The existing methods are all either too cumbrous or are beset with too many fallacies, and it is therefore with great interest that we turn to the method of Professor Lorrain Smith, which he has used clinically in a large number of cases, and the results given by which, from their very unexpectedness, deserve most careful consideration. There is little doubt that the

PLATE V.—TO ILLUSTRATE DR NORMAN WALKER'S CASE OF ERYTHEMA MULTIFORME, CLOSELY RESEMBLING SMALL-POX.

method, which is described in a paper under the above title (*Trans. Path. Soc. London*, 1900), if it is found to be free from serious fallacy, will be of value, not only in blood diseases, but in many others.

The essence of the method is the application of the fact that carbon monoxide (CO.) has the same affinity for hæmoglobin as oxygen has; that when a known amount of carbon monoxide has been absorbed into the blood there is a certain percentage of carboxyhæmoglobin in the whole blood, and that from this it can be calculated how much carbon monoxide would be required to convert the whole of the hæmoglobin into carboxy-hæmoglobin. This amount is the measure of the total capacity of the blood for oxygen also, since hæmoglobin has the same capacity for both gases. The next step is to connect this measure of the oxygen capacity with the volume of the blood, and this depends on experiments which show that the oxygen capacity of any given sample of blood can be calculated by estimating the amount of hæmoglobin colour in it. A measured volume of the patient's blood is therefore taken, and its colour is compared with that of an equal sample of ox blood, the capacity of which for oxygen has been already determined. Since the total capacity is already known, the total volume can be directly calculated.

In practice the patient is made to respire a mixture of oxygen and air, the oxygen being in larger proportion, and to this mixture a known quantity of carbon monoxide is added, and completely absorbed by the patient. The rule is to give enough of the gas to saturate the blood about 20 per cent., which has no appreciable effect upon patients. Enough blood is then drawn from the finger to make 10 c.cm. of a 1 per cent. solution, and the percentage of carboxyhæmoglobin then estimated by the carmine method. To take actual figures, it is found, let us say, that a patient who has absorbed 100 c.cm. of CO. has his blood 20 per cent. saturated. The total capacity for CO., and therefore for oxygen, is 500 c.cm. His blood has the same colour as an ox's blood, whose oxygen capacity is 20 volumes per cent. The volume of the patient's blood is therefore $\frac{500}{20} \times 100 = 2500$ c.cm.

The normal values which have been worked out so far are as follows:—The blood is $\frac{1}{22}$ of the body-weight on the average, or in volume 4·6 c.cm. per 100 grm. of body-weight. The average oxygen capacity of the blood is 18·5 volumes per cent., while the ratio of this to body-weight gives an average of ·83 c.cm. to 100 grm. There are of course considerable individual variations. The average total volume of the blood in males is 3254 c.cm.; in females rather less.

In disease all our calculations have been based on percentage observations of the blood, the unit being the cubic millimetre, and in chlorosis, which is the blood disease on which Lorrain Smith has naturally made the largest number of observations, the essential change has always been regarded as a reduction in the amount of hæmoglobin, with or without a reduction in the number of red corpuscles. The individual corpuscles are therefore poorer in hæmoglobin than the normal. From a study of 30 cases of the disease, Lorrain Smith concludes that the volume of the blood is increased in proportion to the severity of the disease, while the total oxygen capacity, or, in other words, the total amount of hæmoglobin, is approximately normal. The condition may, he considers, be described as consisting in a great increase in the plasma of the blood, the apparent loss in hæmoglobin being due almost entirely to the increase in plasma. This plasma, as is known from other observations, is normal in specific gravity, and presumably in other respects also. If this is granted it is evident that there must be a great increase in the *actual* number both of red and white corpuscles. In one of his well-marked cases, for instance, the red corpuscles per c.mm. were 2,600,000, the percentage hæmoglobin 32·4. The total volume of the blood was 14·3 c.cm. per 100 grm. of body-weight, *i.e.* over three times the normal amount (4·6 c.cm. per 100 grm.), while the actual amount of hæmoglobin was over 91 per cent. of the normal average, that is to say, within the normal limits of variation. If the excess of plasma were filtered off, there would remain about 8,000,000 red corpuscles per c.mm. of the blood. We know already that the first change in the disease is a loss of substance in the corpuscles, without diminution in their number per c.mm., and this apparent maintenance of the normal number must, on the present view, be an actual increase of corpuscles, probably from excessive formation rather than from diminished destruction, and is probably to be regarded as an active effort at compensation in the presence of excessive plasma, as the breaking up of larger corpuscles into several smaller ones increases the respiratory surface of the mass. Later in the disease this compensation in corpuscles fails. There is no compensation in the percentage hæmoglobin; the amount which is present is only rendered rather more available for respiratory purposes. In long-standing and inveterate cases of the disease the actual amount of hæmoglobin seems sometimes to be diminished also.

On these premises the cure of chlorosis with iron salts cannot be due to the synthesis of hæmoglobin in the body from the iron, as the cure may be complete without any increase in the total amount of hæmoglobin. As Lorrain Smith brings out by his tables, the essential process in the cure is the reduction in

the volume of plasma, though how it is brought about it is impossible to say.

The circulatory and respiratory changes in the disease are explained by the fact that such a large volume of blood has to be sent through the vessels in each round of the circulation. The work of the heart is increased, it acts rapidly, may dilate and hypertrophy, and the functional murmurs may be due to an abnormal tensity of the valves and vessel walls, especially during the cardiac beat. The dyspnœa characteristic of the disease is explained by the fact that the increase in the quantity of the blood renders it unwieldy as an oxygen carrier, and that possibly also the blood may be overloaded with carbonic acid.

Lorrain Smith has examined seven cases of pernicious anæmia. The outstanding feature of the blood in this disease is the great reduction of corpuscles and the relatively smaller reduction of hæmoglobin, so that the individual corpuscle is richer in hæmoglobin than normal. Everyone has been accustomed to believe that the actual amount of blood in this disease was also diminished, but our author finds that the amount may vary enormously; it may be twice or three times the normal amount, may be normal, or even subnormal. Further, there is a great absolute loss of hæmoglobin. The worst of his cases had only 28 per cent. of the normal (the percentage was 26 and the actual amount of blood slightly subnormal), and the average of the seven cases was 48 per cent., while the average of chlorosis was 95 per cent. It is pointed out that this possibility of great differences in the actual amount of blood in the body affords an explanation of the well-known clinical fact that two cases of pernicious anæmia with the same number of corpuscles and same percentage of hæmoglobin are not always equally ill. Two cases are cited who were in this position; the one with a normal amount of blood and a total hæmoglobin under 50 per cent. of the normal, was yet well enough to go about and travel by railway; the other, with over 50 per cent. of the normal total hæmoglobin, had a volume of blood about 60 per cent. above the normal, and was confined to bed. Under treatment, the volume of his blood decreased to the normal, and he greatly improved in strength.

Another point of importance is the bearing on prognosis of an increase of volume. It seems possible that when the volume is increased, its reduction by curative means will give marked alleviation of the symptoms.

In anæmia after hæmorrhage the total amount of hæmoglobin is, of course, reduced, but the loss of plasma is evidently rapidly repaired, for all the cases quoted have a normal amount of blood or even a slight excess.

The first question that one has to consider in discussing these results is whether the method is reliable, and one should, in doing this, put out of court any preconceived ideas as to the amount of blood in the body, which are admittedly based on insufficient data. The first possibility of fallacy seems to be that the carbon monoxide may always or in certain cases become transformed in the body, or attached to something else besides the hæmoglobin. Haldane has investigated this point (*Journ. of Physiol.*, xxv., No. 3), which had been raised by Wachholz, and concludes that there is no evidence that the carbon monoxide is destroyed by oxidation in the body, at least of the animals experimented on. Besides the ordinary possibilities of experimental error, which in practised hands are reduced to a minimum, the only other point in the method itself to which one might take exception is the fact that it depends upon comparison of colours at two different steps; and while this comparison when always carried out by the same eyes and under similar conditions is probably not subject to serious error, the results of different observers are apt to be influenced by the personal equation. None of these points, however, are serious. The question that one is inclined to raise, and which is not provided for by Lorrain Smith, is, how far the hæmoglobin in the bone-marrow is affected by the carbon monoxide, whether in fact the method measures the *total* amount of hæmoglobin in the *whole* blood, or simply the amount of hæmoglobin in the circulating blood as distinguished from what one may call the resting blood in the bone-marrow? If the amount of hæmoglobin in the bone-marrow were constant in health and disease, the question of course would not arise, but we know that in pernicious anæmia the amount of nucleated red corpuscles in the bone-marrow is enormously increased, though to a varying extent in individual cases, and the hæmoglobin in the marrow is correspondingly large in amount. Of the marrow in chlorosis we know practically nothing, as chlorotic patients never die of that disease alone, but on Lorrain Smith's own view that there is an actual increase of red corpuscles to compensate for excessive plasma, the probability is that there is a hypertrophy of red, erythroblastic hæmoglobin—containing marrow to a varying extent.

If, by his method, the marrow hæmoglobin is admitted into the experiment, so to speak, then the probability is that all his values are too high, and that the patients who appear to have twice or thrice the normal amount of blood may be people whose bone-marrow is greatly hypertrophied. It is, generally speaking, the worst cases in which the volume of blood seems to be highest, and it is in these cases that one would

expect the compensatory hypertrophy of marrow to be greatest. The bad cases in which there is no increase in the volume of the blood might well be cases in which compensatory hypertrophy has not taken place. Such cases do occur.

One would certainly hope, however, that this source of error, if it be a source of error, may be found to be discountable, for while for the purposes of diagnosis of blood conditions our present methods are fairly sufficient, Lorrain Smith's method would be of great value in the continued investigation of cases, and would probably lead us to an increased knowledge of pathology, and thence of rational treatment.

SURGERY

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The Surgical Treatment of Ruptured Typhoid Ulcer.—Loison has a paper on this subject in the *Revue de Chirurgie*, 10th February 1901. After pointing out that peritonitis may occur in typhoid fever, either by "propagation," where the poisons pass through diseased, though not perforated, intestinal walls, or as the result of rupture, he deals with the statistics of the latter. In French and German literature perforations are said to occur in about nine per cent. of cases, while in English writings the figure is nineteen per cent. Peritonitis following rupture varies much: if the rupture is in the cæcum or appendix, adhesions often limit the process, and a "benign" peritonitis and abscess result; but a perforation of the ileum is far more fatal.

Leyden first suggested operative interference in 1884; Lücke first performed an operation for it the following year without saving the patient. Loison collects sixteen successful cases of operation, and seventy-four unsuccessful, the percentage of successes being twenty-two. An interesting case of his own may be summarised thus:—A soldier, twenty-four years of age, having been ill with typhoid for sixteen days. Sudden severe pain in the right iliac fossa; temperature and pulse rose rapidly, the pulse to 120. No vomiting. Boarding of the abdomen, and tenderness. Retention of urine. Laparotomy fifteen hours after the rupture; median incision. Acute, diffused, septic peritonitis well marked, but no fæcal matter found in the peritoneum. The perforation was discovered 40 to 50 cm. from the ilio-cæcal valve. Five or six Lembert sutures inserted parallel to the bowel's axis sufficed to invaginate and close the rupture. Copious irrigation with boracic acid and then with saline solution; gauze was

packed in above the sutured loop and below it so as to fix it opposite the abdominal wound, and a drainage tube was inserted. The operation took forty minutes. The pulse rose to 140, while for two or three days meteorism and hiccough gave additional cause for anxiety. Subcutaneous injections of saline solution were frequently given. The gauze was gradually withdrawn; creamy pus flowed for some time from the wound, but eventually it closed in, and cicatrisation was complete two months later.

Rupture occurs oftenest in the second, third, and fourth weeks of the disease, and most of the operations have been performed during this period, though success has followed interference at all stages of the disease, even for rupture occurring during convalescence and during relapse. The dominating element in success of course is the time elapsing between the rupture and the operation; in other words, the duration of the peritonitis. Most of the successful cases have been done in the first twenty-four hours. Abbe operated with success sixty hours after the accident.

Loison answers objections under the following heads:—(1) "Difficulty of diagnosis." In most cases the symptoms are well marked: sudden and severe pain usually in the right iliac fossa, sudden increase in the pulse-rate, boarding of the abdominal muscles. The onset may not be so pronounced if adhesions form, in which case the result will eventually be favourable; or if there is prostration, in which case operation is not advisable. Usually the diagnosis is not difficult, and even if the laparotomy reveals nothing "the error is regretable, but generally without prejudice to the condition of the patient." Well—! (2) "The condition of the patient unsuitable for operation." Undoubtedly the state of the patient is less favourable than in ruptures of the stomach, duodenum or appendix, but he should get the chance except in hopeless cases. (3) "Difficulty in finding the rupture." Mauger has collected the records of 107 cases operated on, and in only eight of these did the operator fail to find the site. In four of these eight the drainage sufficed to save the patient, while in the case of the other four there is only one record of the rupture being found at the sectio. (4) "Friability of the intestinal wall." In two cases (Weir's and Allingham's) the wall was so friable as to render suturing impossible; drainage in the one case, and stitching the bowel to the abdominal wall in the other, failed to avert death. (5) "The perforations are often multiple." Suture of several can be done, though, of course, the operation is thereby prolonged; while in "confluent" cases resection may be performed, but with a bad prognosis. Then if a new perforation occur, it can be dealt with; Cushing, in five days, performed three laparotomies on

the one patient—two for successive perforations, and the third for intestinal obstruction from adhesions. A second perforation, too, is accompanied by less risk if the abdomen is already drained. Lastly, in 86 per cent. of cases the perforation is single (Keen).

The Operation.—In all cases in which the diagnosis of rupture is made an operation is indicated, except where the prostrate condition of the patient absolutely precludes it. Loison considers that six hours should intervene between the accident and the operation "to confirm the diagnosis, to restore the patient's strength by injections of ether, of cafein, and of physiological serum (saline solution) . . . and to prepare all that is necessary for the operation itself." The same view is found expressed in Keen and White's Text-Book on Surgery, but many surgeons will contest this and advise instant operation. The surgeon has two ends in view—to close the perforation, and to treat the peritonitis. Loison advises the medium incision, rather than one in the right iliac fossa, as more generally useful; seek the caput cæcum at once and, having found it, start up the ileum, examining inch by inch till the rupture is found. Let the suture be transverse as less likely to lead to narrowing and subsequent obstruction; invaginate the edges of the perforation by Lembert sutures. Attach the bowel to the abdominal wound only in cases where the tissue is too friable to permit such a suture. Enterectomy has been done on several occasions—never with success. After looking for other perforations, irrigate with hot saline solution. If the abdominal wound is large, sew it up partially. Pack gauze above and below so as to retain the sutured portion opposite the wound, and insert a drainage tube. In Wagner's case, also in Handfort and Anderson's (both successful), the abdomen was closed; Loison does not approve of this. Surely he is right.

Congenital Stenosis of the Pylorus.—Monnier has written a "Dissertation" on this subject, *Ueber die angeborene Pylorusstenose in Kindesalter und ihre Behandlung*, which is noticed by Waber in the *Deutsche Zeitschrift für Chirurgie*, Jan. 1901. Monnier records a case successfully operated on by Fritsche, and gives an analysis of a literature of the subject. The account of Fritsche's case, though in many respects conforming to the description which has now come to be recognised as the usual one, is worth quoting from. A child with healthy parents thrives on the breast for some time. After fourteen days of artificial feeding, when all was going well, vomiting suddenly began and persisted obstinately. All food was

returned in the vomit, which contained no bile; the stools were scanty and seldom. The child was somewhat emaciated, and every two or three minutes across the sunken abdomen a well-marked, broad, peristaltic wave could be seen passing from the left of the epigastrium down towards the right, ending in the cæcal region in a hard tumour about the size of an egg which remained for a short time and then disappeared. In the intervals nothing abnormal was noticed, and apparently no tumour could be felt. Fritsche diagnosed congenital stenosis of the pylorus, and performed laparotomy. The pylorus appeared as a dense cylinder 1½ cm. long and 2 cm. in diameter. It was freely movable, the peritoneum was smooth, and there were no adhesions. There was no indication of a lumen to be felt on invaginating the stomach wall. It seemed to be a symmetrically concentric hypertrophy, without any appearance of a neoplasm. An anterior gastro-enterostomy was performed by Wölfler's method. In spite of the stitches in the abdominal wall giving way and consequent prolapse of the intestines the case did well. Five months later the child was splendidly nourished.

Morbid Anatomy.—All the cases subjected to *post-mortem* examination show an immense hypertrophy of the circular muscular fibres of the pylorus. The mucous membrane is often in folds, and the sub-mucosa is sometimes thickened, while in some cases the long axis of the sphincter is increased. Several authors mention the characteristic way in which the pylorus projects into the duodenum, comparing it to the cervix in the vagina. But the main change is the increased thickness of the sphincter with consequent narrowing of the lumen. Of the various theories to account for the condition, that put forward by Thomson of Edinburgh has met with the widest acceptance viz., that the muscular hypertrophy of the pylorus and stomach wall is "merely a secondary occurrence, being obviously due to abnormally increased functional activity," which "must have existed for a considerable period of intra-uterine life. The essential lesion, therefore, is not a muscular but a nervous one—a functional division of the nerves of the stomach and pylorus leading to ill co-ordinated, and therefore antagonistic, action of their muscular arrangements." Monnier apparently holds the opposite view; instead of considering the hypertrophy the result of the spasm, he regards the spasm as secondary to a congenital, developmental hypertrophy.

Diagnosis.—The main diagnostics are summarised by Nicoll, who records a case. *Date*—The symptoms do not usually appear till after a period of health of some days or even weeks' duration. *Vomiting*—Apparently "causeless," persistent, the vomits seldom containing bile. *Constipation*—The intestines

are empty. *Emaciation*—Progressive, and ultimately extreme. *Physical signs* — Peristaltic gastric waves; dilation of the stomach; pyloric tumour (not often perceptible).

Treatment.—Is non-operative treatment of any avail? If the stenosis be not extreme, it must be admitted that it is. Monnier is evidently sceptical of the diagnosis in three cases of Heubner's which recovered without operation, and states that if these are eliminated there is *no* record of recovery under medical treatment. But that is incorrect. Batten (*Lancet*, Dec. 2, 1899) records an interesting case, of which this is a summary:—Child eleven weeks old; well for five weeks, vomited constantly since; other symptoms as usual, with pyloric tumour palpable; marked emaciation. Milk and barley water given through a nasal tube; after several relapses, seemingly always connected with attempts to feed by the teat, the child made a complete recovery, and in six months was plump and healthy, having doubled his weight. A few months later he died of broncho-pneumonia, and the diagnosis of pyloric hypertrophy was confirmed. Batten suggests that the use of the tube prevented peristalsis of the œsophagus, which would have led to irregular movements of the stomach and continuance of the vomiting, and remarks that this case lends support to Thomson's theory of ill-adjusted co-ordination.

The generally accepted view is that operative interference is required. Monnier upholds gastro-enterostomy as the best operation, and has collected six successful and three fatal cases treated by this method. Pyloroplasty must often be impossible. Pylorectomy has no advantages, and is a longer and more serious operation, and the button is unsuited to the small organs and delicate tissues of the infant. Nicoll records a successful case in which he opened the stomach, passed in dressing forceps through the pylorus, and dilated till the peritoneum over it ruptured; the child was healthy a year later. References to the literature will be found in papers by Thomson (*Scot. Med. and Surg. Journ.*, June 1897), Cantley (*Med. Chirurg. Trans.*, London, Vol. 82), and Nicoll (*Brit. Med. Journ.*, Sept. 1, 1900).

Appliances for Intestinal Suture.—In the *Annals of Surgery*, Jan. 1901, Lee, of Chicago, describes an intestine holder for "holding the cut ends of an intestine in position while they are being sutured. The instrument can be readily adjusted to fit any intestine, and any desired tension or relaxation may be given to the parts during operation. As soon as the suture has been completed, the instrument may be made to collapse, and thus may be drawn from the intestine through a very small opening." The appliance resembles the letter T, the horizontal

limb consisting of two bars which can be separated from one another to a varying distance; these are inserted in the intestine parallel to its long axis, and are then separated till the cut ends of the intestine are conveniently stretched, and are held thus close together till the suture is almost completed; the instrument is then withdrawn. The following advantages are claimed for it:—One instrument fits all sizes of intestine, whereas other appliances require varying sizes; no retention sutures, such as are employed with other instruments, are required; no assistants are required; any suture may be used, while other clamps and bulbs are suited only for the Lembert suture; there is not such a tendency to diaphragm formation as with Laplace and other forceps. The last two may be conceded, but the remainder apply equally to other appliances.

Of these, one of the best seems to be O'Hara's forceps. He describes them in a paper which appears in the *Annals of Surgery* for February 1901, and they seem much superior to the last. The instrument is simply two pairs of *very fine* forceps; the blades are not roughened as in ordinary forceps, but one blade has a groove into which a corresponding ridge on the other blade fits; the two pairs can be clamped together firmly "by means of an adaptation of the serre-fine." In order to resect a piece of bowel, the serre-fine clamp is removed, one forceps is placed transversely across the bowel at the upper end of the resection, and the other forceps at the lower end; their tips should be on an exact line with the mesenteric attachment. Other ordinary forceps are placed as usual at the ends of the intervening diseased portion to be resected to prevent leakage; the bowel is then cut through *quite close* to the O'Hara forceps, and the diseased portion is removed. The two forceps are then simply brought together and held together by the serre-fine clamp, and the Lembert sutures are applied, *passing over and including* the forceps, first up one side, and then back down the other, till only a small aperture is left; through this aperture the forceps are withdrawn, and the aperture is closed with a few last stitches. In fact the forceps are like ordinary intestinal clamps; the serre-fine holds them and the ends of the guts so close—and, moreover, they are so slender—that the Lembert sutures can be put in across them, and including them, till almost the last stitch is reached. Care must be taken to test that both walls of one or other end of the gut have not been included in any of the sutures. Lateral anastomosis—gut to gut, gut to stomach, etc.—can be equally well done. O'Hara says that *post-mortem* bowel so sutured can stand the test of water running in with some force from a tap, and the operation is almost as short as with the Murphy button.

GYNECOLOGY AND OBSTETRICS

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Physiology of Pregnancy.—Even a cursory survey of current obstetrical literature serves to show that a vast amount of research is being expended upon the investigation of the as yet unsolved problems of the physiology of pregnancy. In time we shall be able to construct a complete scheme of the nutrition of the fœtus, and of the changes which take place in the maternal organs during gestation; but at present we are only in a position to take notice of scattered observations and advances in our knowledge of these matters.

One of the most interesting of the questions of the physiology of pregnancy has to do with the fœto-maternal interchanges which take place in the placenta. Francesco Varaldo (*Archivio di ostetricia e ginecologia*, vii, 723, Dec. 1900) has investigated this subject by analysing the blood of the umbilical arteries (on its way to the placenta) and that of the umbilical vein (on its way back from the placenta), paying special attention to the histological and physical characters. Varaldo had great difficulties in obtaining sufficient blood for analysis and examination from the vessels of the cord, and more particularly from the arteries; but he found that by seizing the umbilical arteries and vein about 10 cm. from the umbilicus with a pair of Péan's catch forceps, and then opening the vessels with a knife and aspirating (with a pipette) the contents, he could obtain a few drops of blood from the arteries and a considerable amount from the vein; the operation was carried out immediately after the expulsion of the fœtus and just after the establishment of the respiration, but before the birth of the placenta. The infants used in the research were all born at the full term, and came from healthy women whose pregnancies had run a normal course. Some sixteen or seventeen infants were thus examined. The first point determined was that the blood of the umbilical vein is richer in hæmoglobin than that of the arteries; in six cases there was an average excess of the hæmoglobin in the vein over that in the arteries of eight degrees (with a maximum of fifteen) according to Fleischl's hæmometer. This result is directly opposed to that obtained by Doléris, who found that the blood of the arteries was richer in hæmoglobin than that of the vein. With regard to the number of red corpuscles there was no constant difference to be made out—in both the vein and the

arteries their number varied from six to six and a half millions per c.mm. On the other hand the leucocytes showed a marked difference, there being on an average about 4000 more leucocytes per c.mm. in the vein than in the blood of the arteries. In this respect Varaldo's results agree with those of Rauber, who experimented upon rabbits, and who believed that there took place in the placenta a physiological migration of white corpuscles from the maternal to the fœtal blood, and that these white cells aided in the transport of albumen, fat, carbo-hydrates, lecithin, etc. The view, although not accepted by Sänger, has been well received by Preyer, Wiener, Truzzi, and others. Varaldo found that the density of the blood of the vein was less than that of the arteries; the method employed was that of Hammerschlag. It is an interesting fact that the fœtal blood is denser than the maternal. The total amount of water in the body of the fœtus goes on increasing progressively in pregnancy, and is relatively greater than in the adult; the water of the fœtal tissues cannot therefore come from the blood which is poorer in it than the tissues, it must come from some other source, *e.g.* the liquor amnii. The greater density of the blood of the arteries over that of the vein may mean that elimination of solids from the fœtus is going on by the arteries and therefore by the placenta. In the blood of both the arteries and vein there are to be met with numbers of mono-nucleated red corpuscles, and some with two nuclei; their protoplasm stains equally well with that of the non-nucleated cells. Many varieties of leucocytes were observed, small and large, mono and poly-nucleated, with acidophilic and basophilic granules. The poly-nucleated forms were rather more numerous than the mono-nucleated, but not in the proportion found in the blood of the adult, where they constitute three-quarters of all the existing leucocytes. The mono-nucleated forms had a single nucleus rich in chromatin, but had little protoplasm; in the poly-nucleated the protoplasm was plentiful, and there were several nuclei or rather the nucleus had several lobes. In the arteries of the cord the mono-nucleated forms were rather in excess as compared with the vein. The leucocytes with eosinophilic granules were met with in both arteries and vein, being sometimes more numerous in the one and sometimes in the other; those whose protoplasm contains basophilic granules were rarely met with. Red corpuscles which contained granules which stained with the neutral red of Ehrlich, were found in rather high percentages (10 to 20%), but there was no constant difference in their number in the arteries as compared with the vein of the cord. Red cells staining with methylene blue were also rather numerous; those of the vein

mostly stained *in toto*, those in the arteries only in part. Such corpuscles have a pathological significance when met with in the blood of the adult (anæmia). Finally, the blood of both the arteries and vein gave the iodophilic reaction of Ehrlich; it was, however, more marked in the blood of the vein, and the leucocytes which contained iodophilic granules were more numerous in it, *i.e.* in the blood coming back from the placenta to the fœtus. From the facts that leucocytes are more numerous in the umbilical vein than in the arteries, and that those in the vein contain more iodophilic substance, it may be fairly concluded that the leucocytes are not only retained in the fœtal tissues but that they also serve to carry certain substances to the fœtus from the maternal blood in the placenta.

Another aspect of this question of the functions of the placenta has recently been brought prominently before the *Société de biologie de Paris*. Nattan-Larrier (*Compt.-rend. Soc. de biol.*, lii. p. 1111, 1900), after referring to the views of Creighton and Ercolani on the internal secretion of the placenta, pointed out that in the guinea-pig's placenta fine clear or hyaline droplets could be seen projecting from the plasmodial layer into the vascular cavities. These droplets were of a grey colour and were also to be seen floating free in the circulating blood; they were as large as red corpuscles. In the maternal region of the placenta they could also be recognised in the blood-vessels. Nattan-Larrier regarded them not as pathological products but as material on its way to the maternal circulation from the placenta—an internal secretion therefore. Letulle, who took part in the discussion that followed, stated that these same hyaline droplets could be found in the healthy human placenta whether it was developed in the uterus or in an extra-uterine sac; they were found near the surface of the villi. In a later communication, Letulle (*Compt.-rend. Soc. de biol.*, liii. p. 5, 1901) gave further details of the droplets in the human placenta. They appeared either to be fixed to the surface of the plasmodial epithelium (syncytium) or to be floating in the midst of the red corpuscles in the blood sinuses. Their shape varies: when fixed to the plasmodium they were generally spherical, rarely ovoid, and were then very small in size; when they were free they usually had an irregular or broken outline, and had a size varying from 2·5 micro-mm. to 37·5 micro-mm. Their size seemed smaller in full time placentæ than in those at the fifth or sixth month. In a tubal pregnancy at the second month they were larger than in an intra-uterine placenta of the same age. The small ones are hyaline and the large ones granular in appearance. They are neither glycogen nor fat nor mucin, but an albuminoid material of doubtful character. Pinoy

(*Ibid.* p. 6) regarded them not as a secretion of the placenta, but as waste products thrown off by the plasmodium; he looked on the plasmodium as the equivalent of an epithelium at the level of which nutritive exchanges between mother and fœtus were made; the hyaline droplets were like desquamated epithelial cells. It was for this reason that the droplets were increased in poisoning by cantharidate of potash and under the action of microbe toxins (Lœffler's and Eberth's). The case for an internal secretion of the placenta, although probable, cannot therefore be yet made out.

It is surprising to find that very few chemical analyses of the placenta have been made, and yet it is in some respects the most important organ of the fœtus as well as the connecting link between the bio-chemistry of the mother and of her unborn infant. Grandis (*Arch. ital. de biol.*, xxxiii. p. 429, 1900) has investigated this subject and has found that the placenta is evidently something more than an organ of relation, it is a well marked structure constituted in great part of highly differentiated tissue (epithelial). It was very rich in water (83·89%), containing more even than is found in blood; the ashes amounted to 1·073%, and formed the subject of a special article (*Ibid.* p. 439). The total extractive matters amounted to 1·925%, and most of these were albuminous, and only a small part (24%) was made up of true extractives. It is shown that the placenta contains albuminous substances, easily diffusible, and which can be transported in considerable quantities by a physiological solution circulating in the vessels. It is not clear whether they come from the mother or are elaborated in the placenta. The ashes of the placenta contain a large quantity of phosphorus; they also contain more sodium than potassium, and in this respect resemble the ashes of the blood serum and differ from those of all the other tissues.

One of the most noteworthy points about the physiology of pregnancy is the apparent ease with which it passes over into pathology, a transition which is in part accounted for by the fact that it is always physiology working at high pressure. It is sometimes exceedingly difficult to mark off clearly just where physiology leaves off and pathology begins in connection with conditions arising in pregnancy. Grasmück (*Centrlbl. f. Gynäk.*, xxv. p. 6, 1901) gives an instance of this in relation to the hypertrophy of the breasts which occurs in gestation. The patient was a girl of eighteen, pregnant for the first time, and near the full term; the menses had begun at sixteen and had been regular, and the patient herself had always enjoyed good health. She had been married ten months previously, and had become pregnant two months after marriage. The breasts up

to this time had shown nothing abnormal. About the second month of her pregnancy she noticed enlargement of both mammæ, and from that time onwards the enlargement continued till at the end of nine months the breasts were of an enormous size, the right one having a circumference of 73 cm., and the left one of 69 cm. The areolæ had a diameter of 5 cm., and the nipples were sunken; there were no cysts or knots to be palpated. The patient was in good health; and the large size of the mammæ only incommoded her by reason of the weight, and for this she wore a bandage. There was neither albuminuria nor glycosuria; the appetite was good; in fact the physiology of pregnancy was otherwise uninterfered with. The labour resulted in the birth of a healthy child and was normal; ten days later the patient felt quite well and the breasts had diminished in circumference to 58 and 55 cm. respectively. There was not much milk but the infant was fed upon it with the spoon as the nipples were too much sunken to allow of suckling. A month later the breasts had diminished still further in size; they were still secreting milk with which the child was being fed. No explanation of this curious phenomenon was forthcoming.

DERMATOLOGY

THE TREATMENT OF CARCINOMA

By NORMAN WALKER, M.D., F.R.C.P.Ed.,
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IN the *Monatshefte für pract. Dermatologie* for March 15th, Unna has a short paper on the treatment of carcinoma, especially those varieties which occur in the skin. He points out how the treatment by caustics, so freely employed thirty or forty years ago, so entirely supplanted during the last quarter of last century by the use of the knife, is again attracting attention and being widely practised with a large measure of success. In many cancers of the skin, progress is so slow that attempts are justifiable which are not so in other circumstances. As instances, he refers to rodent ulcer, xeroderma pigmentosum, Paget's disease of the nipple, and those forms which attack sailors, chimney sweeps and paraffin workers. In all these diseases there is what he calls a "dermatological" stage, in which there is no distinct evidence of the presence of cancer, but which the experienced can recognise as the invariable forerunner of that malady. As these have usually been treated by

a variety of remedies before their nature has been recognised, the dermatologist has the opportunity of seeing the effects on them of all these remedies.

He mentions especially in this connection that almost all the cases of rodent ulcer which he has seen, have been diagnosed and treated as cases of lupus. While I would not go so far as to agree with his actual words, it is the case that in this country too the same error in diagnosis is often made.

His first named remedy is the Paquelin cautery, which he has modified by adding to it a long sharp point, with which he transfixes the growth in various directions. In many cases this arrests the growth and produces a healthy granulating surface.

Resorcin he has long used and recommended, especially in rodent ulcer. It is applied in the form of a plaster, the effect of which is strengthened by dusting the surface of the growth with pure resorcin in powder form.

Recently he has used benzoic acid, either alone or in combination with resorcin in a 1 to 5 per cent. spirituous solution.

Lastly, he refers with favour to the old cancer cure of arsenious acid, which as a plastic combined with salicylic acid and extract of cannalis indica has, he says, almost as specific and selective effect on the cancerous tissue as has salicylic kreasote plaster in lupus.

Robinson of New York, an old Edinburgh student, shares Unna's opinions as to the treatment of cutaneous cancer by local caustics, and his views on the subject may be found in the *Medical Record* (31st March 1900). In a very extensive experience of these cases he has tried all the various internal remedies which have been from time to time recommended, and he states that none of his cases have derived any benefit from thyroid extract, supra-renal extract or ovarin, yet he is "inclined to believe that some gland extract will be the agent of the future for cancer." He relates one case of inoperable uterine cancer which improved remarkably under nuclein, but as subsequent cases treated in the same way underwent no improvement, he looks on this one case as a mere coincidence.

He regards arsenious acid as the most convenient and generally useful caustic when that treatment is suitable. Equal parts of that and powdered gum acacia are mixed with sufficient water to give the resulting paste the consistence of butter. This is then applied to the surface, directly, if it be raw: if the cancer be covered by healthy epithelium, the surface must be rawed with the curette before making the application. In from sixteen to eighteen hours complete necrosis of the central part of the growth has taken place. The parts surrounding the growth are in a condition of intense inflammation, and this

should be aimed at as helping to destroy any outlying foci of disease. He believes that the fact that the diseased cells are lying in the lymph channels is the explanation of their being destroyed while the surrounding tissues are merely intensely inflamed. In the after-treatment of the cases he uses an ointment of the sub-iodide of bismuth, gr. 20 to ʒi; he does not aim at keeping the wound aseptic, as he believes the inflammation kept up by organisms desirable rather than the reverse.

Robinson then inquires, as no doubt others will, why treatment by caustics has fallen into such disrepute, and believes it to be because very few of the modern surgeons have ever used caustics, and those who have, have not used them properly. "The proper caustic and the proper strength of that caustic must be used, and the proper amount of necrosis and inflammation produced, otherwise the result is usually injurious instead of beneficial."

For this reason he is unsparing in his condemnation of such mild caustics as nitrate of silver and carbolic acid. He says chloride of zinc should only be used to remove redundant growths, and caustic potash only when the disease is superficial. He thinks no reliance should be placed on methyl blue, resorcin, salicylic acid or pyrogallic acid, when we have agents of decided action and virtue. In this sweeping condemnation he differs from many of his countrymen, with whom pyrogallic acid is a favourite remedy in these cases.

It is worthy of note that neither of these authorities can be looked on as opponents of operative surgery. They both refer to cases where the knife is the only remedy; they both admit other cases where the knife is the best remedy; and yet both, and both men of large experience in such cases, are evidently of opinion that in many instances the caustic treatment is to be preferred both from the curative and the cosmetic standpoint.

My personal experience of the method is small, but such as it is it does not agree with Robinson's condemnation of pyrogallic acid, which has more than once proved successful in cases which for various reasons could not be operated on with the knife.

Neither author makes any reference to the treatment of such cases by exposure to the X-Rays, the results of which, in just such cases, are probably the most therapeutically useful of all the effects of these mysterious vibrations. The cases recently published, in an unfortunately abridged form, by Dr Sequeira in the *British Medical Journal* (Feb. 9, 1901), and which he was kind enough to show me at the London Hospital, have seriously shaken my hitherto rigid belief in the absolute necessity of the

knife in such cases. Some were inoperable, others would have involved a loss of substance that the most dexterous of plastic surgeons would have been powerless to conceal, and all were doing well under the treatment, while some were entirely healed. I am still of the opinion expressed some years ago in another place that the proper treatment of a rodent ulcer is to recognise it in its pre-ulcerative stage and to immediately remove it by the knife; but when the operating stage is passed, or even when the growth has gone so far that great disfigurement would result from the operation for its removal, the X-Rays provide an alternative mode of treatment which so far as it has been tried has shown itself most promising.

So far as I know, the Rays have not yet been tried in a case of inoperable scirrhus of the mamma: they certainly deserve a trial in a condition which otherwise has but one ending.

One can hardly take up any dermatological journal at the present day without finding allusion to one or more cases of lupus treated with one or other of the methods of photo-therapeutics. Most of them refer to the treatment by the X-Rays, which must now be regarded as an established means of treating that disease. The method is especially suited for widespread cases where the ordinary destructive methods are contra-indicated on account of the extent of the disease. The X-Rays cause no pain; reactionary dermatitis has been observed by several observers, but is in my experience quite uncommon, and even should it occur the effects are usually for good.

The Finsen method has not been so widely employed, but where it has the results have been most satisfactory. For the patient the drawbacks are the time required for the treatment of an extensive case and the local reaction which follows each application. As compensation is the fact that no other treatment is followed by such smooth perfect scars and so little loss of substance. For the doctor the method has one great objection, viz., the expense. Five hundred pounds for the treatment of one disease is not an outlay which is likely to prove remunerative, and it is obviously only in large centres and in large hospitals that there is any prospect of its introduction. The London Hospital owes its outfit to the patriotic generosity of Her Gracious Majesty Queen Alexandra. May we hope that some local philanthropist will see her way to follow so distinguished an example and donate and endow a similar gift to the larger Scottish Infirmaries.

DISEASES OF CHILDREN

By J. S. FOWLER, M.D., F.R.C.P.Ed.,
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Diseases of the Nervous System.—Syphilitic, Rachitic, and other Paralyses of Early Childhood are discussed by Vierordt in a paper in the *Deuts. Ztschr. f. Nervenheilk*, xviii., 1900. The cause of syphilitic pseudo-paralysis is still obscure. It has been thought to be due to a partial or total separation of the epiphyses, but definite signs of this are usually wanting. The absence of sensory and electrical changes is against the existence of a lesion of the central nervous system, although Zappert, in 1898, found a cervical lepto-meningitis, with degeneration of the fibres of the anterior and porter roots in a fatal case. Vierordt thinks that we must seek an explanation in the presence of a source of peripheral irritation, and points out that similar pseudo-paralyses occur in other diseases in which some such condition is present. (1) Rickety pseudo-paralysis. This is often most distinct when rickets is associated with hydrocephalus, fractures, or bending of the bones, but marked cases are seen apart from these. There may be great loss of voluntary movement, muscular wasting, and abolition of the deep reflexes, but sensation and electrical reactions remain normal, and there is neither contracture nor ataxia. (2) In scurvy-rickets (Barlow's disease) a pseudo-paralysis somewhat similar to that of syphilis may be found. (3) In Chassaignac's "painful paralysis," a sudden jerk of the arm or leg is followed by crying, and then there is complete paralysis for a few days. This appears to be due to a tearing or stretching of ligaments or muscles, or, as in Ollier's cases, to a loosening of the epiphysis. (4) Functional paralysis of deglutition after tracheotomy. In not less than seventy per cent. of the children under two and a half years in whom tracheotomy is performed in Vierordt's clinic, there is, immediately after the operation, paralysis of swallowing. Fluids taken into the mouth escape by the tracheotomy tube, find their way into the lungs, or are ejected by the nose. On careful observation it is seen that the patient sucks the food from a spoon into his mouth, but the larynx never rises as in the act of swallowing, and the fluid is allowed to run back into the trachea without any sign of discomfort. This is not due to post-diphtheritic paralysis, as it occurs too early, and the palate moves naturally. The patellar reflex is also present. When a catheter is passed into the œsophagus it slips in easily, and there is no sign of pressure on the œsophagus by the point of the tracheotomy tube. The

paralysis remains as long as the canula is *in situ*, and if it has to be reintroduced for dyspnœa the paralysis returns. It disappears a day or two after the tube is removed. No *post-mortem* changes sufficient to account for the paralysis have been found; it is certainly not due to trauma, but is probably caused by peripheral irritation caused by the presence of the canula. Vierordt points out that the pseudo-paralysis of rickets, syphilis, and Barlow's disease, have the following features in common:—In young children limitation of movement may result from a peripheral lesion, usually of the skeleton. The lesion varies in nature, it may or may not be painful, is either inflammatory or non-inflammatory, and is often trifling. The limbs are lax and powerless, there is no sign of organic nervous disease, and the paralysis disappears as the original disease improves. Pain on passive movement is absent or slight. These paralyses are functional, and are probably caused by a reflex inhibition of muscular tone. They are analogous to the pseudo-paralyses which accompany joint disease or injury in older persons.

Hereditary Spinal Muscular Atrophy in Childhood (Hoffmann, *Deuts. Ztschr. f. Nervenheilk*, xviii., 1900, 217).—This disease, of which several cases (including one by Bruce and Thomson in this country) have now been described, is characterised by its hereditary character and by its commencement in the early years of life. It begins with an atrophic paralysis of the muscles of the pelvic girdle and thigh, which extends to the muscles of the back and arms. The tendon reflexes are abolished, the electrical reactions remain, the muscles of the face are unaffected, the mental faculties remain unimpaired, the special senses, common sensation, and the sphincters are not involved. Hoffmann ascribes the anatomical changes in a case previously reported by him. Changes were found in the nucleus of the spinal accessory, and the anterior roots and peripheral nerves, as well as the cells of the anterior horns, were degenerated all down the cord. The muscles showed atrophy and ultimately disappearance of the fibres, without nuclear proliferation; the striæ were retained until the changes were well advanced. There was some interstitial lipomatosis and fatty degeneration of the muscle spindles.

Plantar Reflex in Infants.—Morse (*Pædiatrics*, xi., 1901, p. 13), from an examination of the plantar reflex in 254 infants, concludes that there is no constant reflex in the first two years, so that, below that age, no conclusion can be drawn from its presence, absence, or special character. He finds that we may have flexion on both sides, or extension on both sides, or complete absence of the reflex on both sides; or we may have

extension on one side and flexion on the other, or that the reflex may be present on one side and absent on the other. Under one year the most common conditions are complete absence of the reflex (41 per cent.), and extension on both sides (24·5 per cent.). In the second year 57·5 per cent. of children have the adult reflex, and only 9 per cent. extension.

Meetings of Societies

The Edinburgh Medico-Chirurgical Society

THE sixth meeting of the eightieth session was held on March 6th, Mr A. G. Miller, the President, in the chair.

Dr Bruce, for Dr Affleck, showed a greatly dilated heart from a woman, aged sixty-nine, who had been in the Longmore Hospital for Incurables for seven years. She had been tapped 188 times, and 53,494 ounces of fluid had been removed from the abdomen, or a weight equal to one and a half tons. There had never been any albuminuria or any dropsy other than ascites. The liver was pulsating and enlarged. The largest amount of fluid removed at one time was 414 ounces.

Mr Alexis Thomson showed *multiple cartilaginous loose bodies* removed from the left knee-joint of a woman aged thirty-six. She had rheumatic fever on two occasions, at the ages of twelve and sixteen. At the age of seventeen, the left knee became swollen and painful; it has troubled her more or less ever since. She was able to go about and do her work until eight months ago. She had noticed the loose bodies during the last nine years. The joint was greatly swollen, its upper pouch extending four inches above the patella; the bodies were felt in large numbers, moving in a moderate amount of fluid. The joint was opened by an incision on the outer side, and the bodies were shelled out by means of the fingers; a portion of the synovial membrane was removed for microscopical examination and the wound was closed.

The bodies measured over a pint in volume and amounted to several hundred. They varied in size from a pepper grain to a small hazel nut; larger masses as big as the patella were formed by the agglutination of the smaller ones; they were irregularly nodulated, of a pearly white colour, and of the consistence of cartilage. Microscopical examination showed them to consist of hyaline cartilage like that met with in chondromata, with scattered areas of calcification. The synovial membrane was thickened and vascular; its free surface was

studded with papillary processes or villi; on microscopical examination these villi were found to consist of a very cellular fibrous tissue surrounding loops of blood-vessels. Mr Thomson was inclined to regard the loose bodies in this case as of the nature of new growths or cartilaginous tumours growing in the synovial membrane, and not as the product of any disease in the joint; the villous processes in the synovial membrane appeared to be the result of the presence of the loose bodies pressing upon and irritating the membrane.

Dr Dawson Turner showed a Röntgen photograph of renal calculi from a man, aged fifty, who passed a small stone *per urethram* eleven years ago, after suffering from the usual symptoms of the passage of a stone from the right kidney. Shortly after he passed another stone with same symptoms from the left kidney. Since then he has constantly suffered pain in both kidneys, but principally in the right, with recurrent bleedings, especially when he made extra exertion. On admission there was marked enlargement of the right kidney, with tenderness on pressure. Dr Dawson Turner made a very successful skiagraph, which showed three distinct shadows in the right kidney and a less apparent single shadow in the left kidney. At the operation the right kidney was found to be hydronephrotic, and contained three calculi, which were removed. The left kidney was not interfered with. Patient passed urine after operation, but early next morning a severe hæmatemesis took place and continued till he died. On *post-mortem* examination it was found that no stones remained in right kidney, but the left kidney contained a large number of calculi.

Before taking the Röntgen photograph the patient's bowels were thoroughly emptied, and during the taking of the photograph the abdominal movements of respiration were as much limited as possible. The tube used was carefully selected, and an exposure of two minutes was given. Two photographs were taken, both of which gave the same result.

Dr Chalmers Watson gave a demonstration on the comparative pathology of spinal cord disease, supplementary to that given two months ago. The demonstration included a series of photographs from the case recorded at the former meeting—illustrations of the lumbar, dorsal, and cervical cord, stained to show the state of the vessels and nerve fibres in these areas. The rest of the demonstration was taken from the case of a hackney, 18 months old, which exhibited cord symptoms similar to those recorded of the other case, and which led Dr Watson to diagnose a lesion of the cord, most marked in the posterior part, of a nature akin to Friedreich's ataxia in the human subject. The diagnosis was confirmed at the *post-mortem* examina-

tion. As in the former case, the special object of the demonstration was to illustrate the primary importance of vascular disease in the production of the pathological and clinical picture. The histological appearances supported Dr Watson's views: (1) that vascular disease in the cord plays a more important rôle than is commonly believed; (2) that the lesions in the cord are the local expressions of a general disorder, rather than distinct entities of nervous origin; (3) that they are manifestations of chronic auto-intoxication from a general disorder of nutrition; (4) that these conditions ought to be curable in their early stages. Confirmatory evidence from human pathology was shown as follows: (*a*) a section of the lumbar cord from a case of tabes of thirteen months' standing, to show softening—degeneration in relation to advanced vascular disease, the patient dying of malignant disease; (*b*) sections of the cervical cord from a case of long-standing hemiplegia, to show that the degeneration of the fibres of the crossed pyramidal tract was not associated with marked vascular lesions.

Mr Alexis Thomson read a communication on stenosis of the intestine occurring as a sequel of strangulated hernia. After a brief reference to the occurrence of obstruction from kinking or strangulation, resulting from the formation of adhesions, attention was directed to the mechanical constriction of the bowel which is met with in strangulated hernia. The grooves or furrows caused by this constriction usually disappear when the bowel is liberated and give no further trouble. They may however persist, in which case the symptoms of obstruction are not relieved by the operation and further interference is imperative. The constriction groove may recover sufficiently to allow the passage of the intestinal contents, but at a later period become the seat of a fibrous stricture, in which case the symptoms of obstruction reassert themselves after an interval of two or more weeks. The persistence of the constriction grooves was illustrated by the case of a boy aged two who had been under the author's care a year ago. He was operated upon for strangulated congenital inguinal hernia of the left side; a loop of small intestine was found in the sac, black, retaining its lustre, and showing constriction grooves at either end of the loop where it had been caught at the internal ring. The bowel was regarded as viable and was returned. The symptoms of obstruction were not relieved by the operation. Three days later the belly was opened by enlarging the existing wound; the damaged loop of bowel was found and pulled out at the wound; the constriction grooves had not recovered; the bowel above was greatly distended. Enterostomy was performed with the assistance of a Paul's tube. Ten days later the damaged intestine

was resected and the ends joined by a double row of sutures. The child is now quite well. The portion of bowel removed measured 23 cm. Sections made in the situation of the proximal constriction groove showed infiltration of all the coats of the bowel with leucocytes and red blood cupuscles; there was no appearance of necrosis of the mucosa. The stenosis which depends on the formation of a fibrous stricture was illustrated by a case which had been under the author's care four years ago. The patient, a man aged 31, was operated upon for a left inguinal congenital hernia which had been strangulated for three days. A loop of small intestine was found in the sac, showing lymphy exudation on its surface and two well marked constriction grooves, one at either end of the loop. The bowel was returned. He was already convalescent three weeks after the operation, when he began to exhibit symptoms of chronic intestinal obstruction. He declined further interference and was not seen till nine weeks later. He was then emaciated; the abdomen was distended with visible coils of small intestine arranged in a ladder pattern actively engaged in peristaltic movements, and emitting loud gurgling noises. The belly was opened close to the scar of the previous operation; the damaged bowel was found to be adherent to the anterior abdominal wall; it presented a well marked fibrous stricture at either end of the loop; the bowel above was enormously distended and hypertrophied, while below it was collapsed and empty. Enterostomy was performed above the proximal stricture. Sixteen days later the affected loop of bowel was removed, and the ends joined together with the assistance of a Murphy button. He made a good recovery, and is now, four years later, alive and well. The portion of bowel removed was 43 cm. in length; in the position of the proximal stricture the mucous and submucous coats were found to be replaced by fibrous tissue, apparently as a result of necrosis and exfoliation of the mucosa. The distal stricture was the result of the transformation into fibrous tissue of the outer, longitudinal muscular and serous coats; the mucosa was preserved. The author was not aware of the occurrence of such lesions in the case of femoral hernia, but Mr Francis M. Caird, who took part in the subsequent discussion, referred to a case of fibrous stricture following strangulation of a femoral hernia, the specimen from which is preserved in the surgical museum of the University. Mr A. G. Miller, Mr Cotterill, and Dr Ronaldson also spoke.

Dr Edwin Bramwell read a paper on "Myasthenia Gravis," which will appear in the next number of *The Scottish Medical and Surgical Journal.*

Dr Noël Paton read a paper "On a method of estimating

the interference with the hepatic metabolism produced by drugs" (with Dr Eason).

Dr Paton said it has been for long believed that certain drugs diminish the activity of the chemical changes in the animal body, and the observation that, under the administration of sulphonal, hæmatoporphyrin, an imperfectly metabolised katastate of hæmoglobin, may appear in the urine, has further directed attention to this matter. But so far, no attempt has been made to determine which tissues or organs are specially affected, or to measure the degree of interference exercised by different agents.

It appeared that some indication of the structures acted upon, and of the degree of interference with their functions, might be gained by a study of the extent to which the waste nitrogen of the body is elaborated into urea, since it is in the liver that this formation of urea is chiefly carried on, and since, therefore, any interference with the activity of this gland should make itself manifest in a diminution in the formation of urea. Dr Paton has already shown that under the influence of diphtheria toxin, the proportion of nitrogen elaborated into urea is diminished, and that during digestion, when the hepatic metabolism is more active, the proportion of nitrogen in urea is increased.

With the object of testing this idea, Drs Paton and Eason commenced to study the influence upon the elaboration of nitrogen into urea of some drugs which are supposed to interfere with the normal course of metabolism. Unfortunately, the investigation was interrupted, and they were compelled to make this preliminary communication in the hope that it might induce others to carry out a more extended study of the subject.

1. *Morphine.*—Although morphine has so marked an influence on the nervous system, evidence that it affects the general metabolism is wanting. Nor is there any indication that it has a special action upon the liver, for Rutherford found that 3 grains of the acetate had no influence on the secretion of bile.

2. *Sulphonal.*—The appearance of hæmatoporphyrin in large quantities in the urine after the administration of sulphonal has been taken to indicate a profound interference with the chemical changes in the body, and probably with the hepatic metabolism, which is more especially concerned in the elaboration of the normal urinary pigment.

This experiment seems to show that sulphonal markedly interferes with the elaboration of nitrogen into urea. There was a decrease of 9 per cent.

3. *Coal Gas.*—The general diminution in the processes of oxidation in the body produced by carbon monoxide is well

known: but how far this affects the hepatic metabolism has not been investigated. Araki showed that the administration of carbon monoxide causes the appearance of sugar in the urine. The observations of Drs Paton and Eason showed that coal gas diminishes the proportion of nitrogen in urea and of sulphur in the oxidised form, but that it does not alter the proportion of phosphorus to nitrogen.

4. *Alcohol.*—It has been generally recognised that alcohol in large doses has a markedly toxic action on the metabolism, but its influence on the hepatic function has not been specially studied. That it has a special action on the liver, seems to be indicated by the part it plays in the etiology of cirrhosis of the organ. Reiss states that it diminishes urea and increases uric acid, while Schmiedeberg and Hoffman found that it hindered the synthesis of hippuric acid. Drs Paton and Eason found a diminution of 7·5 per cent.

Conclusions.—The observations are too few to allow certain conclusions to be drawn, but those which they suggest are as follows:—

1. Certain drugs have a marked effect on the elaboration of the waste nitrogen into urea while others do not act in this way, (*a*) sulphonal, alcohol and coal gas (carbon monoxide?) have this action; (*b*) quinine in small doses and morphine in large doses do not manifest it.

2. Under the influence of coal gas the percentage of oxidised sulphur in the total sulphur of the urine is diminished concomitantly with the diminution in the percentage of nitrogen in urea, while under morphine the percentage of oxidised sulphur as well as the percentage of urea nitrogen are unchanged, thus bearing out the conclusions as to the relationship of these processes arrived at by Dr Paton two years ago.

3. It is probable that the diminution in the proportion of nitrogen in urea and of sulphur in the oxidised condition affords an indication of the interference with the hepatic metabolism produced by any drug.

4. While the administration of morphine causes a diminution in the proportion of phosphorus to nitrogen in the urine, coal gas (carbon monoxide) has not this action.

Obstetrical Society of Edinburgh

THE fifth ordinary meeting of this Society was held on the 13th March; the President, Dr R. Milne Murray, being in the chair. A large number of specimens were exhibited by Professor Simpson, Dr Fordyce and Dr Haig Ferguson.

Dr Alexander Bruce and Dr Elsie Inglis (who was elected a Fellow of the Society at this meeting) communicated "a case of hydatid mole, with death six months after from cerebral hæmorrhage," with a microscopic and lantern demonstration. The patient, a woman aged 22, apparently made a perfect recovery after the expulsion of the myxoma. Six months later, however, she was found lying in a semi-conscious state. Hemiplegic symptoms set in and the patient died a few days later. At the *post-mortem* examination, a large hæmorrhage occupying and tearing up the whole of the occipital lobe on the left side was found. The arteries and veins of the body were normal. Only five cases of such tumours associated with cerebral symptoms have been recorded, and in only three of these were cerebral tumours found. It is well known, however, that such myxomatous uterine tumours have metastases. In this case, in the occipital lobe, in the lungs, and in the walls of the uterus, nodules were present, which on examination proved to be typical deciduoma malignum. The lungs were studded with numerous hæmorrhagic foci of round outline. At first it was not known what these were due to. The key to the solution was, however, found on opening the uterus. Two tumours were present in its walls and the mucous membrane was continuous over them. These were found to be due to deciduoma malignum and similar characteristic specimens were present in the brain and lung hæmorrhages.

Dr R. C. Buist, Dundee, narrated his case of deciduoma malignum which occurred in a married woman aged 24. On examination the uterus was found to be enlarged to 4 inches and anteverted. It was curetted, but three days later a tender irregular sausage-shaped tumour was found lying parallel to Poupart's ligament on the right side. Under treatment the pain subsided but the swelling remained and became harder, while the vaginal hæmorrhage continued. Three months later this swelling began to increase from the size of a forefinger to that of an orange, while the patient's strength decreased. Later she complained of pain at the base of the right lung, and friction sounds were audible here. She had a slight watery mucous sputum occasionally streaked with blood. At the operation the tumour was as large as a child's head and of an irregular nodular purple character. The band of its attachment to the right cornu was fully an inch broad and contained large vessels. The uterus being also much increased in size was removed also. The wound healed perfectly, but she gradually sank and died from asthenia, the lung condition having persisted all through.

Dr F. W. N. Haultain said that he had listened with great interest to Dr Bruce's communication, as it very fully coincided

with a case he had himself examined and treated successfully two and a half years ago by vaginal hysterectomy. Lantern slides which he showed of this case demonstrated the two varieties of cellular elements, viz., individual cells with a clear cell substance whose nuclei showed reticulation of the chromatin and large multinucleated protoplasmic masses, the protoplasm of which was granular in character and the nuclei deeply stained. Commenting on the pathology and histogenesis of these growths, he stated that much controversy existed, there being three theories: (1) That it was a sarcoma independent of pregnancy, but modified by that condition; to this the London Obstetrical Society, in a late discussion on the subject, had almost unanimously pinned their colours. (2) That it was a malignant change occurring in the decidual cells, and was thus a maternal sarcoma entirely due to pregnancy; this was the original theory propounded by Sänger, from which the term "Deciduoma malignum" emanated. (3) That it was the result of active proliferation of the epithelial covering of the chorionic villi, and hence was of the nature of an epithelioma; to this theory the great majority of recent German observers adhered and he himself strongly supported. As is well known, in the young placenta the epithelial coverings of the chorionic villi are extremely active; the syncytial layer and Langhan's cells could be seen extensively proliferating; and if one examined closely these individual elements, they could hardly fail to notice the close resemblance which existed between these cells and those of the tumours in question. To still further pursue the histogenesis of the growth, one naturally turned to the consideration of the structure of the villi in myxoma of the chorion; for although this was a rare disease in itself, occurring only once in about 2000 pregnancies, fully 50 per cent. of all cases of deciduoma followed the expulsion of a mole. On examining the villi of a myxoma, one was struck by the excessive proliferation of the epithelial elements as shown first by Ercolani, and thus an undoubted further link to the chain of evidence in favour of an epithelial origin was added.

The upholders of the simple sarcoma theory based their arguments chiefly on the points that in some cases no distinct history of previous pregnancy was present, also that the cells tended to travel by the blood-vessels, and that similar structures had been noted in sarcoma of the testicle. These arguments might be met, firstly, by the fact that no case had yet been described outside the child-bearing period of life, and though pregnancy could not be proved, neither could the reverse. The tendency of the cells to pass by the blood stream was the physiological characteristic of the epithelial coverings of the villi,

whereby the maternal sinuses were opened into and the nourishment of the fœtus obtained; while though multinucleated protoplasmic masses had been noted in sarcoma of the testicle, these masses never assumed the characteristic reticulated form found in deciduoma malignum. In Sänger's original article in which he described the growth as decidual in origin, the drawings show multinucleated protoplasmic masses which, as far as drawings go, might be considered as similar to the syncytial masses derived from the villi. Further, he laboured under the disadvantage of having had no trace of villi in his specimen from which the origin of the growth could be followed. Everything tended to point to an epithelial character, and the term "deciduoma" might be substituted by "chorio-epithelioma," the term "syncytioma" being too exclusive to include the proliferation of the cells of Langhan's layer. The clinical features were extremely interesting. Fortunately, unlike Dr Bruce's case, evidence of the presence of a new growth was usually present in the uterine hæmorrhage. The presence of metastases in the lung, which were evidently inactive, had already been demonstrated by von Franque and others. These had been found after the removal of the original uterine growth, and he could only account for their inactivity by the probability that the cells could only live and proliferate in fluid blood, and that in the metastases they had given rise to so great an extravasation of blood that it subsequently clotted, and by this means deprived the cells of their vitality. It was an object lesson that the presence of metastases was not a contra-indication to the radical extirpation of the original growth.

Dr M'Vie, of Chirnside, narrated a case of spontaneous rupture of a varicose vein of the lower extremity at the seventh month of pregnancy. The rupture took place at a point two inches above the malleolus and the hæmorrhage was very severe, but the mother recovered after the use of saline injections. The fœtus was expelled four weeks later, but exhibiting few signs of having been dead all this time, though the fœtal heart ceased to be heard two days after the hæmorrhage, nor were fœtal movements felt after this occurrence.

Forfarshire Medical Association

THIS Society met in the University College, Dundee, on Thursday, March 7th, at 8.30 P.M. Dr A. J. Duncan in the chair.

Dr Angus M'Gillivray showed several cases.

Case I. Case of "Green Vision" associated with a sub-

hyaloid macular hæmorrhage in a young man aged 29. The hæmorrhage came on seven weeks ago during straining at stool. and was of the usual shape but only two optic discs in size, On the following day when looking out of the window and at a distance of nine feet from it, he discerned on the window pane a circular disc three feet in diameter and of a brilliant green colour. The size of the disc varied as the distance from the window. The green colour remained for twenty-one days when it was replaced by a dark shimmering scotoma.

Case II. A case of subhyaloid macular hæmorrhage similar in shape and position to Case I., but without any green vision.

Case III. Case of downward coloboma of the iris, associated with extensive downward choroidal coloboma.

Case IV. Case of upward and outward coloboma of the iris, corresponding to ten o'clock but not associated with any other congenital anomaly.

Case V. Ophthalmic changes following fracture through right anterior fossa. Right optic disc looked atrophic but vision was $\frac{6}{9}$ Snellen. The right pupil retained only consensual contraction. The lesion of the nerve appeared to have involved the centripetal pupillary fibres, leaving the papillo-macular fibres apparently intact.

Case VI. Case of thrombosis of the descending temporal retinal vein of six weeks' standing with the characteristic wheel-shaped appearance at the yellow spot resembling albuminuric retinitis. No albumen nor sugar was found on examination of the urine.

Case VII. Case of paralysis of the right sixth nerve with right facial paralysis since birth in a girl aged 6.

Case VIII. Case of right conjugate paralysis with the power of convergence intact and slight facial paralysis.

Dr Foggie showed for Dr G. Halley a girl of 15, the left half of whose lower maxilla had been excised for recurrent myeloid sarcoma in November last. An interdental palate had been inserted fourteen days after the operation and retained for six weeks. There was now no deformity and the patient was able to masticate fairly well with the right side.

Dr Gray spoke on the microscopic appearance of the tumour first removed which he had stained and examined.

Dr W. E. Foggie showed a case of syringo-myelia of the cervical region in which along with a marked muscular wasting in the upper left arm there were associated trophic changes in the left elbow joint. The right arm had lately begun to show evidence of involvement in respect of loss of power and slight wasting. Tactile sensation was everywhere retained but the

whole of the left arm was analgetic, while both arms were thermo-anæsthetic as far as the elbows.

Professor Kynoch showed several specimens.

1. Two multilocular ovarian cysts associated with menorrhagia of some months' duration, removed from women after the menopause.

2. Fibroma of the vagina of the size of a lemon growing from the anterior wall.

3. Interstitial fibroid of the uterus enucleated through the posterior fornix.

4. Microscopic sections of adenoma of the body of the uterus, simple and malignant, hæmorrhage being the only symptoms in both cases.

5. Microscopic sections of primary carcinoma of the urethra.

New Books and New Editions

Rectorial Addresses delivered before the University of Edinburgh, 1859-1899. Edited with an Introduction by ARCHIBALD STODART-WALKER, M.B., F.R.C.P.Edin. London: Grant Richards. 1900.

IT was a happy inspiration that prompted the publisher and the editor to bring together into one volume the thirteen addresses delivered by eleven Rectors during an eventful forty years in the history of the University. In two instances the Lord Rector gave a valedictory address in addition to his address on commencing his term of office. It is interesting to note that the two men who were so anxious to do their duty and so careless of their own ease were Mr Gladstone and the Earl of Iddesleigh.

There might be a risk of sameness and repetition, but all the addresses were delivered by eminent men, lawyers and statesmen, with the one exception, probably the most eminent of them all, Thomas Carlyle. Each address is permeated by the individuality of the author, and all are wonderfully unlike each other as to types and treatment. Each and all contain a certain amount of advice to the students, and the usual pathetic touch of an old man full of years and honours, almost envying the youths who have their life before them. The addresses vary much in length, from the fifty-two pages of Mr Gladstone's valedictory oration to the modest sixteen pages which satisfied Lords Derby and Balfour of Burleigh. What different chances these addresses had when they were delivered. The trumpet tones of Glad-

stone would help the listeners to thole the awful length of his remarks on the "place of ancient Greece in the providential order of the world." Carlyle's wearied voice carried his pregnant thoughts to the nearer benches, and to most of his hearers his address must have seemed a failure. Yet which will be read now? Moncrieff and Robertson gave most felicitous and instructive addresses which will well bear comparison with those of the great English statesmen who also filled the Rectorial Chair.

Mr Stodart-Walker has written a short but most interesting introduction, which adds much to the value of the book. If some good millionaire will see to it that every matriculated student of the University gets a copy of the work along with his matriculation ticket, he may be certain that his money is well spent.

Practical Gynecology: a Comprehensive Text-book for Students and Physicians. By E. E. MONTGOMERY, M.D., Professor of Gynecology, Jefferson Medical College; Consulting Gynecologist to the Philadelphia Lying-in Charity. Pp. xxviii., 819, with 527 illustrations. London: Rebman, Limited. 1900. Price 25s.

MONTGOMERY'S "Gynecology" is the latest addition to the stream of works on diseases of women which has steadily flowed to us from across the Atlantic during the past ten or twelve years. Some of them have been written by a group of authors (*e.g.* Baldy's), and others, like that under review, have been the work of one man (*e.g.* Skene's, Kelly's, and Garrigues'); but all of them have been bulky tomes and most of them have been profusely illustrated. At the present time there is no branch of medical study with which the profession in the United States has more closely identified itself and in a more honourable way than gynecology.

Montgomery's work is described as a "comprehensive text-book," and with its 800 pages and 500 illustrations (mostly original) it is all that. It has been under consideration for fifteen years, and gives evidence of mature thought and practical experience of no mean order. In his preface the author says, "I will offer no apology for presenting an additional text-book upon gynecology," but he does not enlighten us as to whether it is that he regards such an apology as unnecessary or as impossible! Certainly it may be freely conceded that there have been text-books before now that have shown far less reason for their birth than this one, and indeed it may be anticipated

that even in the crowd of good American "gynecologies" the work of Professor Montgomery will take a high and honourable place.

The work is divided not into chapters but into sections and sub-sections (of the latter there are 648 !), and in turn the malformations, the inflammations, the deviations, the hæmorrhages, and the tumours are considered. All the sections are well illustrated, and generally the illustrations are really helpful in elucidating the text; the bird's-eye view of an abdominal section given on page 83, although helpful also, is almost grotesque and suggests a Chinese artistic effort. With regard to the subject matter of the work it may be said that it is well up to date and includes a description of the most recent operative procedures, while with regard to the special opinions of the author on vexed questions and moot points they may be characterised as careful and far removed from extreme. Taking, as an instance, the treatment of uterine fibroids, we find emphasis laid upon the fact that the mere discovery of a fibroid is no reason in itself for its removal or even treatment; with regard to the electrical procedures the author has been led to the conclusion that they should be reserved for the uncomplicated cases; those which threaten life should be operated upon. The chief medicine recommended is, after all has been said, ergot; thyroid and mammary extract are referred to but with no degree of approbation; and chloride of calcium is condemned as likely to lead to changes in the aorta and heart valves which are themselves more dangerous than the fibroid. The operative procedures are usefully arranged in two groups: *first*, those by the vaginal route, *e.g.* dilatation and curettage, incision of cervix, incision of the capsule, removal by torsion, incision of pedicle, enucleation or morcellement, ligation of the vessels; and hysterectomy; and *second*, those by the abdominal route, *e.g.* castration, ligation of vessels, myomectomy, enucleation, partial hysterectomy, and panhysterectomy. We may close this review by quoting with approbation the principle upon which the author insists and which he puts into the following form:—"No organ should be sacrificed the function of which can be maintained." Such is healthy gynecological procedure.

Les Maladies qu'on soigne à Berck. Par F. CALOT. Crown 8vo, pp. 440. Paris: E. Masson. 1900. Price frs. 2.50.

THIS work takes the form of an ordinary surgical monograph, although it is evidently written to advertise Berck-sur-Mer as a watering-place specially favourable to the treatment of surgical forms of tuberculosis. A reference to the map shows Berck to

lie on the north coast of France, about midway between Dieppe and Boulogne.

The keynote of the work is to be found on the fly-leaf opposite the title-page, where the author announces in full capitals and in inscription form, "Je voudrais voir gravée au frontispiece des hôpitaux d'enfants l'inscription suivante: aux tuberculoses fermées, la guérison sûre." "Ouvrir le tuberculoses (ou les laisser s'ouvrir) c'est ouvrir une porte pas laquelle la mort entrera trop souvent."

With appropriate variations this theme is repeated in nearly all of the twenty-two chapters into which the work is divided, and while there is admittedly a great deal of truth in the author's thesis, we cannot but feel that he would have been more convincing if the brass instruments in his orchestra had been less blatant, and the big drum less in evidence.

"SCOT."

On the use of Massage and Early Passive Movements in Recent Fractures and other Common Surgical Injuries, and the Treatment of Internal Derangements of the Knee Joint. By W. H. BENNETT, F.R.C.S., Senior Surgeon to St George's Hospital, etc. 8vo, pp. 97, with 12 illustrations. London: Longmans, Green & Co. 1900. Price 4s. 6d.

THIS small volume contains three lectures delivered by the author at St George's Hospital, in the beginning of last year. The first two lectures furnish an excellent *résumé* of the modern method of treating simple fractures by massage and early movements, a method which Lucas-Championnière did so much to advance, and which Mr Bennett was one of the first in this country to adopt. A careful study of these pages and a faithful trial of the methods which they advocate will do much to counteract the baneful tendency towards operative interference in uncomplicated fractures which is at present abroad.

In the third lecture the author summarises his large experience of internal derangements of the knee joint. His conclusions are based on no fewer than 253 cases observed and treated by himself, and it astonishes us to find that only 36 of these called for operation, and that in but half that number did the fault lie in the semilunar cartilages, the symptoms in the others being referable to small pedunculated bodies or to abnormal folds of synovial membrane springing from behind the ligamentum patellæ.

The paragraphs on treatment are of great value. We are cordially with the author when he says that "no support or apparatus of any kind should be employed unless absolutely

unavoidable," but our experience (admittedly much less than his) does not lead us to value as highly as he does the benefits of rest and massage in the cure of this condition, hence our wider appreciation of the scope of operative treatment.

"SCOT."

A Dictionary of Medicine and the Allied Sciences. By ALEXANDER DUANE, M.D., Assistant Surgeon to the New York Ophthalmic and Aural Institute. Third edition, enlarged and thoroughly revised. Pp. 646, with eight full-page coloured plates. London: Rebman, Limited. 1900. Price 14s. net.

THE aim of this work, as stated by the author in the preface, is "to give sufficient but succinct information concerning every word that the student or physician will be likely to meet with in the course of his professional reading." The medical vocabulary has been so enriched, or at least enlarged, of late years, that the author in the preparation of this edition decided to exclude words which had become obsolete. In this way he has been able to bring his dictionary down to date without enlarging it. The volume is embellished by eight coloured plates. We have pleasure in commending the work as a useful, satisfactory, and evidently carefully prepared dictionary.

Normal Histology. By EDWARD K. DUNHAM, Ph.B., M.D., Professor of General Pathology, Bacteriology and Hygiene in the University and Bellevue Hospital Medical College, New York. Second edition. Pp. 318, illustrated with 244 engravings. London: Rebman, Limited. 1900. Price 12s. net.

WE entirely approve the plan and purpose of this work. It is written by a teacher who has found that the memory of the student is helped by giving him a brief and clear outline of histological structure and physiological function of the various tissues and organs of the body. This gives to the intelligent student facts which are logically correlated, and both his understanding and his memory are helped. From these fundamental correlated facts as a foundation it is easy and safe to build, while without them the superstructure is like the house built upon the sand. The text is well illustrated, and at the end of the book there is a chapter on histological technique. From what we have indicated to be the aim of this book, the highest praise we can give its author is to say that he has successfully realised his purpose.

Electricity in Gynæcology. By RICHARD J. COWAN, L.R.C.S.I., L.R.C.P.I., etc. Crown 8vo, pp. 132, 36 illustrations. London: Baillière, Tindall & Cox. 1900. Price 3s. 6d. net.

THE necessity for such a book as that under review is not evident. It is not intended for the specialist in gynæcology, for the author says in his preface that "this manual is particularly directed to the general practitioner"; yet it is doubtful whether anyone save a specialist would venture on many of the methods of electrical intervention recommended in its pages. The writer is a firm believer in the special merits of electricity as a curative means, although he is modest enough to say that he does not "see the least likelihood of electricity entirely replacing the therapeutic measures of the present day." For this much we ought to be thankful. There are several illustrations, chiefly of instruments; but little or no reference is made to these in the text. There is also a great deal of free recommendation of the electrical method of treatment in a great number of gynecological conditions, from the disorders of menstruation to suppurative salpingitis, ectopic gestation, and fibroid tumours. The general practitioner would be well advised to consult one of the larger text-books of gynecology in which he would get a less enthusiastic, and, therefore, more practically useful estimate of the value of electricity in gynecological disorders.

A Manual of Medicine. Edited by W. H. ALLCHIN, M.D., F.R.C.P., Senior Physician and Lecturer on Clinical Medicine, Westminster Hospital, Examiner in Medicine in the University of London, &c. Vol. I.—General Diseases; Diseases excited by atmospheric influences; the Infections. 8vo, pp. 442, 2 plates. London: Macmillan & Co. 1900. Price 7s. 6d.

THE idea of the manual, of which this is the first volume, is an excellent one. It is intended to give students an account of disease, not from the pathological but from the clinical standpoint, and each disease is treated by someone who has made it a special study. It is in short a miniature "system of medicine." Miniature in this connection is of course a very relative term, for we fear that if the other diseases are allowed to run to the same length as those described in the present volume, the student who begins his studies with this volume will be an old-established practitioner with several assistants before the series is completed. But this will in no way detract from the value of the book to him, for the short monographs are accurate, thoroughly up to date, and well written. The authors are almost all London Physicians, and the book is obviously meant for use mainly in the London schools, but it will nevertheless be found of use in other parts of the world as well. It is

undesirable to single out special papers for mention; all are good in different ways, and in none have we come across any serious error.

Consumption: its Nature and Treatment, with a chapter on Bacteria and Antiseptics. By WILLIAM H. SPENCER, M.A., M.D., M.R.C.P.Lond., Consulting Physician to the Bristol Royal Infirmary; formerly Lecturer on the Principles and Practice of Medicine, and on Pathology, at University College, Bristol. Small 8vo, pp. 82. London: Henry J. Glaisher. 1900. Price 1s. 6d. net.

THIS little brochure is based on the author's lectures to medical students at Bristol, and its "chief purpose" is "to instruct the intelligent and educated public." If that public is content to be instructed by vague, ill-considered statements, the expression of an antiquated pathology, and is willing to take high-flown language in place of hard facts, by all means let it read the book. Dr Spencer casts doubt on the bacillary origin of consumption and is inclined to lay more stress on the individuality of the patient, but it is exceedingly difficult to pin him to a definite expression of opinion, for a statement made with a fair amount of precision in one chapter is often explained away in the next. As regards the treatment of consumption, apart from generalities about hygiene and pure air, and the recommendation of creosote, the author has little to tell us, for while he seems to lay stress on a special form of inhalation which he makes his patients practise, he gives no details of the process, and simply refers us for these to another work which he has written on the subject. Books like this serve no useful purpose.

The Diagnosis and Treatment of Syphilis. By TOM ROBINSON, M.D., Physician to the Western Skin Hospital. Second Edition. London: J. & A. Churchill. 1900. 8vo, pp. 138. Price 3s. 6d.

THE author's "object in writing this work has been to present to students and practitioners a trustworthy, practical and concise treatise on Syphilis." The result, however, is not satisfactory. Considerable space is taken up in the effort to show that the recognised divisions of primary, secondary, and tertiary phases of the disease should be given up, but no student would learn from its pages the important facts as to the usual interval between inoculation and the development of the hard sore, and between that and the outbreak of what we still prefer to call "Secondaries."

"Irritating pus cells" are considered to be the cause of soft

chancres, and the absorption of "pus" as the explanation of a suppurating bubo.

The clinical descriptions are strangely inaccurate—one example will suffice. On p. 36 it is said of syphilitic skin diseases that "(1) They are all of a copper colour"; (2) a few lines down, "the most common form of eruption" is properly described as "rose-coloured." On the next page it is said that "the syphilitic roseola passes from a distinct rose-coloured stain to one of a brass hue, then to a dirty yellow." . . .

As part of the treatment of phagedænic chancre the patient is to be immersed in a warm bath and ordered to remain till the edge of the wound is healthy, *i.e.* "after a hundred hours of this amphibious treatment." How is this "practical" in private practice? We need not occupy space with further examples. The wonder is that the book has reached a second edition.

Editorial Notes and News

Royal College of Physicians, Edinburgh; Royal College of Surgeons, Edinburgh; and Faculty of Physicians and Surgeons, Glasgow.

THE quarterly examinations of the above Board, held in Edinburgh, were concluded on 4th Feb., with the following results:—

First Examination, Four Years' Course.—Of four candidates entered the following passed the examination:—Archie Wark M'Donald, Motherwell.

First Examination, Five Years' Course.—Of twenty-two candidates entered the following eight passed the examination:—Herbert William Robinson, Lancaster; William Lang Hodge, Plymouth; Charles Chaves, Bombay; Charles Richard Whittaker Accrington (with distinction); John Roberts, Portmadoc; Alan Cunliffe Vidal, Eton; John Wylie, Glasgow; and Timothy Archdeacon, County Cork; and five passed in the division of Physics, four in Biology, and one in Chemistry.

Second Examination, Four Years' Course.—Of fifteen candidates entered the following five passed the examination:—Napoleon Scipio Monnier, India; David Graham Barkley, Ireland; William Barclay, Kilbirnie; Thomas Taylor Smith, Halifax; and William Hunter, Sunderland; and one passed in the division of Anatomy, one in Physiology, and two in Materia Medica.

Second Examination, Five Years' Course.—Of twenty candidates entered the following eight passed the examination:—Alfred Edwin Elliot, Cheshire; Alexander Allan, Stirlingshire (with distinction); Percy James Thomson, Glasgow; John

Brydon, Hartlepool; John Archbold Turnbull, Guernsey; John Walker, Galston; James M'Manus, Antrim (with distinction); and Robert Leichman Morrison, India; and two passed in Anatomy.

Third Examination, Five Years' Course.—Of thirty candidates entered the following twenty-two passed the examination:—Aloysius Francis Fleming, Youghal; Alice Deborah Sibree, Madagascar; Alice Marietta Marval, Bombay; Harold Raby Parkinson, Manchester; Rharsetji Nowrosji Khory, Bombay; Reginald Herbert Brierley, Rochdale; Thanker Bhawoo Kulkarin, Bombay; Bertram Harry Connell, Swindon; John William Cross, Houghton-le-Spring; William Owen Prichard, North Wales; Roger Llewellyn Williams, South Wales; James Harvey Stewart, Aberdeenshire; James John Mason Noble, Glasgow; Timothy Foley, County Cork; Alan Leslie Fielding, India; Robert Patrick Hall Blackstock, Galashiels; John O'Regan, Mitchelstown; James M'Lean, Beauly; James Charles Galloway, Carlisle; Edward Parker Haythornthwaite, Cumberland; William Vincent Sutton, Cork; and Michael John M'Carthy, Cork.

Final Examination.—Of seventy-four candidates entered the following thirty-three passed the examination and were admitted L.R.C.P.E., L.R.C.S.E., L.F.P. and S.G.:—James Joseph Lynch, County Cork; William Alexander Cole, Lagos, W. Africa; John Allan, Glasgow; Peter MacKellar Dewar, Glasgow; Andrew Gairn, Edinburgh; William Burns, Belfast; Archibald Buchanan Laidlaw, Glasgow; Raram Singh, Lahore, India; James Smith Colquhoun, Durham; Raghubar Dayal Saigol, Umballa, India (with honours); George Weldon Hibbert, Bradford; James Owen James, Monmouthshire; Hugh De Mel, Ceylon; Frank Reginald Featherstone, Adelaide; John Emmerson Proud, Durham; John Philip Cameron, Bangalore; Alice Neville Vowe Johnson, L.S.A., London; George William Robert Skene, Colombo; William Arthur Dawson, Bandon; John Joseph Lowell, Singapore; William Wilkie Deans, Horsforth, Yorks; Lewis Worts, Colchester; Devi Datt Pandya, Lucknow; William Charles Bentall, Farnham; Frederick William Kerr Tough, Aberdeen; William Prichard Airey, Liverpool; George Henry Usmar, India; Clarence Frederick Arthur Gray, M.D., C.M., Canada; Joseph Bernard O'Mahony, County Cork; Shaik Abdul Rahman, Burma; David Charles Williams, South Wales; Ezra Khamis, Kurdistan; and Anthony Strong Rose, Morpeth; and eight passed in the division of Medicine and Therapeutics, five in Surgery and Surgical Anatomy, twelve in Midwifery, and four in Medical Jurisprudence.

Notes on Drugs, etc.

"**Kelene**" Chloride of Ethyl has long been extensively used as a local anæsthetic, and this specially purified form has proved itself in our hands excellent as such. The tubes in which it is put up are fitted with a self-closing spring stopper which is of great advantage when one is operating single-handed.

It is, however, as a general anæsthetic that Kelene claims special attention. The discovery of its powers in this respect appear to have been in the first accidental, patients whose gums were being sprayed for the purpose of producing local anæsthesia "going off." Our own experience has not been altogether successful, as patients did not invariably become insensible. It is not so easy to administer as chloroform, as on account of its great volatility a special mask is required; but it has been largely and successfully used on the Continent, and the risks are apparently so small and the recovery of the patient so rapid and complete that it is evidently well worth a trial, especially in minor out-patient surgery. It is being extensively used in Hacker's Clinic at Innsbruch, and those who are interested will find a full translation of an article by his assistant in the December number of the *Birmingham Medical Review*. Dr Tuttle of New York expresses in crisp American one of its advantages, "it does not require a Saratoga trunk to carry it around."

Messrs Beiersdorf & Co., Hamburg, have sent us a very neat sample case containing miniatures of their preparations, some of which we have previously noted. Small pieces of their well-known plaster muslins sufficient to explain to patients how to use any that may be prescribed, a most necessary precaution; a more recent preparation, their Salicylic Soap plaster, and small collapsible tubes of their casein ointment form a really useful sample. We referred some months ago to a novelty of theirs—the Mercolint Bib—which is evidently proving increasingly useful. The patient takes no medicine and requires no rubbing: he only puts on his bib in the morning, and the effects of the mercury are soon evident. It is believed to act through evaporation and inhalation, and we have several times found that its effects were beneficial when other forms of anti-syphilitic treatment were not well borne. The ease of its use makes it very popular with patients.

Two of the most prominent of English manufacturing chemists (**Burroughs Wellcome & Co., and Oppenheimer, Son & Co.**) have turned their attention to a favourite Edinburgh formula, the Triple Syrups, and have made them up each in their own favourite form, and under their favourite names, Tabloid and Palatinoid. The Tabloid contains the equivalent of Syr. Ferri Phosph. Co. ♏ 30, Syr. Ferri et Quin. et Strychniæ Phosph. ♏ 15, and Syr. Hypophosph. Co. ♏ 15, and the Palatinoid is made up in the same proportion. They are easily carried about, easily swallowed, and appear to be as efficacious as their liquid equivalent. The former firm have also made up a "double Blaud" tabloid equal to 8 grns. of Blaud's pill which will be welcome to those to whom the swallowing of more than one pill at a time is somewhat of an effort.

Their small-sized "Enules" suppositories for children will no doubt be found as useful as this ingenious invention has been in adults.

The effervescent Lithia Citrate Tabloids form a pleasant method of administering that drug, but lest the firm be too much uplifted by our praise we may mention that some Chinosol Tabloids sent us have not retained the whiteness which they presented when we received them.

NOTICE.

All communications to the Editorial Department, including Exchanges and Books for Review, should be addressed to THE EDITOR, Dr W. RUSSELL, 3 *Walker Street, Edinburgh, and all business communications, including Subscriptions, Advertisements, &c., to* THE SUB-EDITOR, Dr NORMAN WALKER, 7 *Manor Place, Edinburgh.*

THE SCOTTISH
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JOURNAL

MYASTHENIA GRAVIS[1]

Read before the Medico-Chirurgical Society, Edinburgh

By EDWIN BRAMWELL, M.B., M.R.C.P. Lond. and Edin.,
Edinburgh

THE purpose of this paper is to draw attention to a disease which is as yet little known to the profession, no case of myasthenia gravis having been, so far as I know, yet recorded in Scotland. Although certainly a rare disease, I venture to think that myasthenia gravis is a condition with which every practitioner should be acquainted, since it is often mistaken for hysteria, since it is often fatal, and since in some cases, at least, a fatal termination can be averted by appropriate treatment. I have been fortunate in having had the opportunity of examining nine cases of the disease, a larger number probably than has come under the notice of anyone in this country. Up to the present time only some eighty or possibly ninety cases have been reported.

In this communication I propose to describe briefly the more important clinical features of the disease. The following

[1] Many cases of this disease have been described as cases of asthenic bulbar palsy. This nomenclature is, I think, most misleading, and should be discontinued for the following reasons:—Firstly, the symptoms are not limited to the bulbar muscles; it is indeed quite exceptional for the limbs and trunk to escape; and secondly, from what is known of the disease I think it probable that cases occur in which the extremities are alone affected, in the earlier stages of the disease at least. A case of this kind is recorded by Ormerod in the *St Bartholomew's Hospital Reports*, vol. xxxi. p. 50.

case, which was kindly sent to me by Dr Miller of Dundee, is typical :—

An unmarried female, aged 23, a school teacher, was seen on 10th November 1900. She complained of difficulty in speaking and of weakness in the hands and arms. Excepting that her mother was a somewhat nervous woman, the family history was excellent. Three years previously the patient had suffered for a few months from bloodlessness, otherwise she had enjoyed good health up to the commencement of the present illness. The first symptom, viz., difficulty in speaking, especially after talking for some time, was noticed ten weeks ago on her return from a two months' holiday. During the following six weeks the difficulty in speaking became worse, and it was noticed that she spoke through her nose—when she rose from bed in the morning speech was always natural and easy, and it was not until the day was well advanced that she experienced any inconvenience. The lips used to become stiff and unmanageable, and her articulation was consequently defective. At night saliva ran from her mouth on to the pillow. When she drank, fluids regurgitated through the nose. The jaws became easily tired when eating, and there was difficulty in swallowing solids. The neck felt weak, and she had difficulty in supporting her head. When brushing her hair at night her arms became easily tired, and she was obliged to rest them repeatedly. After playing on the piano for a short time her hands speedily became fatigued, so that she was unable to stretch an octave. She had had several attacks of breathlessness. All these symptoms were more pronounced towards evening and if she was excited. In the morning she usually felt perfectly well. Not only was any muscular exertion followed by fatigue in the muscles involved, but as she herself expressed it, "The using of any muscles seems to have that effect on the others." For a fortnight before I saw her she had been resting from work, and her symptoms had improved considerably.

The patient's state on 10th November 1900 was as follows :—

A well-developed, well-nourished, and intelligent girl; she is not anæmic; she answers questions promptly; her memory is good and she does not appear to be emotional. There is

a lack of expression about her face, and when she speaks a want of mobility of the lips. There is no facial asymmetry, and she can make satisfactorily such movements as frowning, whistling, and showing the teeth. She cannot, however, wrinkle her forehead; when she is told to close her eyes tightly, little force is required to open them. There is no distinct weakness of the oral sphincter. Her speech is a little indistinct, but the defect is trifling; when, however, she reads aloud from a book, articulation becomes gradually more indistinct, her utterance nasal and the voice weaker, while she has to stop frequently for breath. There is, in fact, a combination of defective articulation and phonation. There is no ptosis, nor is there any tendency for the lids to drop when she continues looking upwards for any length of time. The eyes are not prominent. The ocular movements are perfect; there is no nystagmus. The pupils are equal, of moderate size, and react perfectly both to light and on accommodation. No weakness in the muscles of mastication is to be detected. Although she swallows slowly, there is no noticeable defect in the act of deglutition. The palate movement is impaired and its reflex irritability is diminished, especially on the left side.

Dr Logan Turner, who kindly examined the larynx, was of opinion that the cords came together well and that abduction was perfect.

The tongue is protruded straight and its movements are satisfactory.

The special senses are unaffected. The acuity of sight and hearing is good, there is no diplopia and the discs are normal. No defect of the visual fields is to be detected by the rough test.

With the exception of doubtful weakness of the muscles of the back of the neck, the movements of the limbs and trunk are good. She is unable, however, to hold the arms above the head for more than half a minute. She has noticed no weakness in the legs and can walk four or five miles without feeling tired. Her gait is quite natural. There is no muscular wasting and no fibrillary twitchings are to be seen. Although an exhaustive electrical examination was not made, the myasthenic reaction was quite evident in the right biceps muscle.

Excepting for a sense of tiredness, amounting to pain, in

the muscles of the neck and in the arms after they have been much used, there are no subjective sensory disturbances. Of late she has not been sleeping so well as usual; she sometimes feels too tired to sleep.

A careful examination revealed no objective sensory defect.

As to the reflexes. There is a brisk jaw jerk. The arm jerks are active, those on the left side being distinctly greater than on the right. The knee and Achilles jerks are well marked. There is no ankle clonus. The plantar reflex is of the flexor type. There has been no affection of micturition; her bowels are regular.

Her appetite and digestion are good. The heart is of normal size, the sounds pure, the pulse regular and about 90 per minute. She had had no attacks of palpitation.

She has a slight feeble cough, and suffers considerable inconvenience from inability to cough up the phlegm which collects in the pharynx in consequence of a pharyngitis from which she is at present suffering.

Menstruation is regular and natural. There is no enlargement of the thyroid gland. The urine was not examined.

Let me in a few sentences epitomise the clinical history of this case.

A girl of twenty-three, who had previously enjoyed good health, without apparent exciting cause gradually develops difficulty in speaking, swallowing, and chewing, weakness of the ocular muscles, of the palate, of the neck, and of the arms. In the morning she is usually free from symptoms, but as the day goes on, weakness in these various muscles develops. If she continues using any of the above-mentioned muscles, a state of temporary paresis results, associated with a feeling of fatigue. The muscular weakness is unaccompanied by atrophy; the faradic contractibility in the affected muscles (biceps) is rapidly exhausted; the deep reflexes are brisk; the plantar reflex is of the flexor (normal) type; the sphincters are unaffected; there is no objective disturbance of sensation, and no affection of the special senses.

Symptomatology.—The most prominent clinical feature of myasthenia gravis is the facility with which the muscles become fatigued by voluntary effort. The term *myasthenic state* seems applicable to this phenomenon. A voluntary movement, which

is at first perfectly carried out, becomes rapidly feebler each time it is repeated; finally, if persisted in, *all* power of performing the movement may be temporarily lost; after a short rest the movement can be again performed with almost as much power as on the first attempt. A variable degree of persistent paresis is often present in the affected muscles. This paresis is usually slight, but may amount to a complete paralysis (*e.g.* complete ophthalmoplegia externa); it probably represents a more advanced stage of the myasthenic state, in which the recuperative power of the neuro-motor apparatus is impaired in an unusual degree.

Just as varying degrees of motor weakness are met with, so corresponding variations in the Faradic excitability of the muscles occur. It is, however, the rapidity with which the muscles become fatigued by the Faradic current which is especially characteristic of this disease; the term *myasthenic reaction* has been given to this condition. If a tetanising current be applied to an affected muscle, at first an active contraction is obtained, but in the course of a short time the muscle ceases to respond. The myasthenic reaction is not constantly present; at one time a muscle can be exhausted in half a minute, at another time it may be impossible to exhaust it at all. The myasthenic reaction, although not absolutely pathognomonic of the malady, is a diagnostic sign of great value.

The muscles react normally to galvanism.

Pathology.—The scope of this paper will only allow of brief reference to the pathology of the disease. Of eighteen cases collected and analysed by Harry Campbell and myself which had been examined *post-mortem*, in none was there a lesion which would satisfactorily account for the symptoms present during life. Dejerine and Thomas, it is true, at the Paris Congress of last year reported definite "findings" in a case of myasthenia gravis, but it remains to be seen whether future observations will show that these changes are constant and are the cause of the symptoms.

There is reason for supposing that the disease is due to a toxin which is, I think, probably of endogenous origin. Possibly, too, in the subjects of myasthenia gravis there may be some congenital defect or abnormality either in the

construction or mode of functionating of the neuro-motor apparatus.

The majority of writers believe that the seat of the lesion is in the motor nervous system rather than in the muscles, and clinical evidence suggests that it is the lower motor neuron which chiefly suffers. Males and females are both liable to the disease, which occurs most frequently between the ages of twenty and forty. Some cases have followed upon an acute infective disease, but it seems probable, I think, that in these cases the infective disease acts, not as the primary exciting cause but rather as a predisposing agent, by lowering the resistance of the tissues. In about a quarter of the recorded cases there has been a neuropathic heredity.

Diagnosis.—Turning to the question of diagnosis. Where the symptoms are well marked the diagnosis of myasthenia gravis is easy. The recognition of slight, and especially of complicated cases, may, on the other hand, be a matter of great difficulty. The following are the chief points upon which the diagnosis is to be based :—

Firstly.—The presence of weakness, which is often slight in degree and is unassociated with atrophy—the muscular weakness varies greatly in intensity from time to time and tends to affect in varying degree all the voluntary muscles—the muscles of the extremities and trunk as well as those innervated by the cranial nerves.

Secondly.—The facility with which the muscles become exhausted both by voluntary effort (myasthenic state) and by Faradism (myasthenic reaction).

Thirdly.—The absence of sensory symptoms, apart from the fatigue of exhaustion, of sphincter trouble, and of mental disturbance. The deep reflexes are usually brisk, while the plantar reflex shows no characteristic alteration from the normal.

In differentiating myasthenia gravis from hysteria the absence of a neurotic temperament and of sensory symptoms and the presence of ocular and facial paresis, weakness of the neck muscles and of the myasthenic reaction are the chief points of diagnostic value.

More advanced cases of myasthenia gravis are often mistaken for chronic progressive bulbar palsy.

Points of special diagnostic importance are the absence of

muscular atrophy in myasthenia, the presence of ocular and upper facial paresis, of the myasthenic reaction, and, above all, of variability in the severity of the symptoms.

Prognosis.—The prognosis in any given case of myasthenia gravis is a matter of great uncertainty. In most cases the disease runs a course which is characterised by temporary improvement and relapses.

Some cases improve and remain free from symptoms for months and even years, but since the majority of reported cases have only been recently observed, time must elapse before it is possible to say with certainty that complete and permanent recovery ever takes place.

On the other hand, the disease is often fatal. Thus of sixty cases collected and analysed by Harry Campbell and myself, twenty-three ended fatally. It is, however, probable for various reasons that these figures exaggerate the fatality of the disease. Although the average duration of life in the fatal cases was about a year and a half from the onset of the disease, cases are on record which have lived five, ten, even fifteen years.

In the great majority of fatal cases death has been due to an attack of dyspnœa. The end is usually sudden and often quite unexpected.

Treatment.—Although at the present time no specific treatment is known which will arrest or cure the disease, palliative measures are of great importance.

Since muscular exertion and mental excitement increase the severity of the symptoms, they must both, so far as possible, be avoided. Psychical impressions undoubtedly exert considerable influence on the course of the disease, and I would strongly advise that the patient be given a favourable prognosis. The gravity of the condition should be made known to his friends, and they must clearly understand that the disease is not hysteria. They must neither make light of his symptoms, nor encourage him to fight against the weakness when it appears.

Especial care should be taken to spare the muscles chiefly affected by the myasthenic state. If the symptoms are severe, the patient should be confined to bed. Cold is to be avoided, since it increases the myasthenia.

The feeding of patients suffering from myasthenia gravis requires most careful attention. When there is much weakness of the muscles of mastication and deglutition, the patient should be enjoined to take the larger portion of his food early in the day. All solid food should be minced in order to spare the muscles of mastication, and to avoid, so far as possible, the risk of choking. It is probable that the lives of some of the fatal cases might have been saved had this precaution been attended to, for impaction of an unchewed bolus in the throat has in several cases caused death from asphyxia due to pressure on the windpipe.

Faradism is on no account to be used since it increases the myasthenic state. Massage appears to be of no service. Weak galvanic currents applied to the affected muscles have been said to do good and may be tried.

Although one has seen a number of drugs employed one cannot say with certainty that any had a distinctly beneficial effect on the course of the disease.

According to Strümpell, the attacks of dyspnœa may sometimes be relieved by drawing forward the tongue. In a severe attack in which the patient's life is threatened, artificial respiration should be resorted to. It is, I think, possible that in such a case inhalations of oxygen and transfusion with saline fluid may prove of value.

A CASE OF UTERINE FIBROID WITH UNUSUAL SEQUEL

AND

A CASE OF PREGNANCY WITH OVARIAN CYST

Read before the Obstetrical Society, Edinburgh

By W. E. FOTHERGILL, M.A., B.Sc., M.D.,

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CASE I.—MRS R. aged 35, was married at the age of 21, but has never been pregnant. She enjoyed good health before the commencement of her present illness. Menstruation commenced at the age of 16; it was of the twenty-eight days type and was normal in every respect until it ceased at the age

of 33. About the beginning of the year 1899 she noticed a swelling in the lower part of the abdomen which grew steadily, but caused her no inconvenience until about six months later, when she failed rapidly in health and became unable to carry on her work as an artist. I saw her at the request of Dr Dearden of Manchester in August 1899, and we then found her to be suffering from pressure symptoms caused by a fibromyoma uteri which was the size of a large cocoanut. It was quite symmetrical in shape, its lower portion occupied a position low down in the pelvis and could be easily and completely traced by a finger in the vagina. The cervix was large and soft, but not patulous. The upper portion of the growth reached an inch above the umbilicus. It was not so hard as the lower portion, and we were satisfied that there was a central area near the fundus in which softening by cystic or other degeneration was going on. Operation was absolutely refused, and the patient remained in bed week after week. The growth increased gradually in size, and was at last almost as large as an eight months pregnant uterus. Almost six months later Dr Dearden informed me that he suspected phthisis, as there were physical signs at both apices, she had a bad cough, and was greatly emaciated. An attendant who shared her apartment was suffering from advanced phthisis at the time.

At the end of April 1900 she was in about the same condition, when the umbilicus, which had become swelled and inflamed, broke down and emitted a copious discharge of thin yellow pus, which continued to flow, its quantity being estimated at at least a pint daily. I saw her with Dr Dearden when the discharge from the umbilicus had been going on for six weeks. The pus was not foul smelling, but had a strong disagreeable odour resembling that of the contents of sebaceous cysts. The abdomen was soft, and gave a clear note on percussion down to the umbilicus, but in the lower portion of the abdomen there remained the firm mass consisting of the lower portion of the fibroid. The patient was so thin that the condition could be mapped out very clearly on bimanual examination. The cervix and the portion of the tumour continuous with it were much higher up than before, and the pelvis was accordingly much more clear, the rectum and bladder being quite free from pressure. We at last persuaded the patient to go into the

Clinical Hospital for Women and Children, where she was admitted on June 25th. I may mention that the house surgeon, on examining her, judged, as her doctor had previously done, that she was suffering from phthisis. (Her maid who had been sent to another hospital died, about this time, of acute general tuberculosis.)

On admission, the patient weighed five stone, five and three-quarter pounds (her ordinary weight being about nine stone). On June 26th, under chloroform, a probe passed in at the navel descended half way to the pubes. The opening was enlarged, and a considerable cavity was cleared out and packed with gauze. She was so ill that it was not thought desirable to interfere farther. There was very free discharge of pus which continued unabated until July 14th. She was then no worse than on admission, and it was thought desirable by Dr Buckley and myself to make an attempt to remove the fibroid. We accordingly had her anæsthetised, and incised from the umbilicus down to the pubes. We found the whole anterior aspect of the tumour adherent to the abdominal wall. The lower portion of the growth had apparently become infected from the wound in the upper portion, for the whole mass was in a sloughing condition, and had the characteristic foul smell of putrifying matter. The interior of the mass was removed in handfuls until it became clear that nothing was left except a thin wall or capsule about one-eighth inch thick which appeared to be adherent to every organ with which it was in contact. On passing a couple of fingers into the vagina, the cervix was recognised as a small mass the size of half a walnut. The cervical canal was not recognised, so a hole was made through the wall of the sac just to the left of the cervix, and a large rubber drainage tube was pushed through it, so that one end protruded at the vulva, the other at the abdominal wound. Gauze was then packed round the tube in the interior of the tumour, and the patient was sent back to bed. She soon began to improve, and the discharge, which escaped freely by the vaginal tube and by the wound, rapidly lessened in amount as the sac contracted. On July 30th the drainage tube was cut in half, and the vaginal portion was removed. On August 10th the tube was left out altogether, there being hardly any discharge. There was albumen in the urine at this time, but the

lung symptoms were gone, as were the physical signs of pulmonary disease. On August 23rd the face was puffy, there was albumen in the urine, and the patient weighed only five stone, two pounds. The wound, however, was practically healed. She went home on August 25th. Her temperature was irregular all the time she was in hospital, but its variations were unimportant. I have heard from Dr Dearden (January 1901) that she continued to improve after leaving hospital, putting on flesh, and showing no further signs of renal or pulmonary disease. His present opinion is that she will completely recover her health.[1] This case is mentioned as a curiosity, rather than because any special information can be gathered from it. The nature of the process which led to the adhesion of the tumour to the abdominal wall, and to the formation of the pus which flowed from the umbilicus remains doubtful. It was not due to infection by streptococci and staphylococci, though these certainly gained entrance after the umbilical sinus was enlarged, and doubtless aided in completing the destruction of the tumour mass. I am inclined to think that the primary process was tubercular, judging from the nature of the pus, and the clinical facts which have been mentioned. Tubercle bacilli could not be demonstrated in the pus by staining, but this is a point of negative value, for in my experience it is very rarely that bacilli can be found in the pus from chronic tubercular lesions.

CASE II.—On July 6th, 1899, Mrs R., a tall, fairly stout and healthy looking young woman, consulted me about an abdominal swelling which she had first noticed six months previously, and which had grown steadily in size. She gave the following history:—Her mother died at the age of 61, and one of her sisters died at the age of 35, both of them, she understood, of ovarian tumours. Neither of them was operated upon. Her own age was 35 years. Her health had been uniformly good. She had had three children, the youngest being three years old. Pregnancy, labour and lactation had been normal each time. The menstrual function had always been normal. She had menstruated as usual in the month of April 1899, but had not done so subsequently. Apart from amenorrhœa, no

[1] She has gained 2½ stones in weight, and is now well, March 15, 1901.

symptom of pregnancy had been noticed; although in her previous gestations there had been morning sickness and tenderness of the breasts from an early date. Physical examination of the breasts gave no information. Inspection of the abdomen revealed a swelling the size of an eight months pregnant uterus occupying a central position. There was complete dulness on percussion, fluctuation was pronounced. Palpation above the umbilicus detected a solid body suggesting a fœtal limb, while, in the hypogastrium, a solid mass was felt which resembled in size and shape a fœtal head. Auscultation gave a negative result, and on using percussion with the patient in various positions, it became clear that there was no free fluid in the abdomen. *Per vaginam* the cervix was felt high up in the pelvis; it was soft and large. The os was not open, but was split on the right side. The body of the uterus could not be distinguished from the lower portion of the abdominal tumour, which could be felt through the vaginal fornices, and appeared to be solid on the right, but cystic on the left side. Ballottement gave a negative result. The abdominal tumour was too tense to admit of satisfactory bimanual examination of the solid body which occupied the hypogastrium.

I was unable to exclude pregnancy, although amenorrhœa was the only symptom and softening of the cervix the only sign. I therefore told the patient that she had a cystic tumour and was also between two and three months pregnant. My proposition to remove the tumour was well received, and she went home to consult her doctor, who had sent her to me with a view to operation. She resides some distance from Manchester.

On July 27th, the doctor informed me by letter that his patient had fainted suddenly the previous day, and had been revived with difficulty. Such casual examination as her collapsed condition would allow showed him that the bulk of the tumour had disappeared. On July 30th, he wrote to say that the patient was passing blood and clots freely *per vaginam*, and was being carefully nursed till she should be fit for removal to a local hospital, where I had the privilege of seeing her on August 10th. She then had a high temperature, and was still bleeding, the discharge being very foul. The abdomen was

flat; there was dulness in the hypogastrium and right flank. Palpation revealed the fundus uteri half way up to the umbilicus, while the dull area to the right of it was solid to the touch. *Per vaginam* the uterus was large and flabby, and occupied the middle line; the os admitted a finger tip, and an ill-defined solid mass was felt on the right corresponding to the dull area of the abdomen. I understand that the uterus was thereafter emptied of placental debris and blood clot. She left the hospital on August 20th. I heard from the doctor later that his patient was up and about, though her temperature was not satisfactory and she had lost flesh. On September 4th he wrote that she was again in bed with an irregular temperature. The cyst had filled up and was as large as ever, while the patient's condition was far from satisfactory. I saw her with him on September 5th, and found the physical signs just as on July 6th, except that the cervix was small and firm. We arranged to remove the cyst about a week later.

On September 7th the doctor wrote: "Mrs R. had a sharp attack of inflammation connected with the cyst after you examined her. She suffered a considerable amount of pain yesterday, and was much collapsed. She has had a bad night with pain, abdomen more distended—pulse 100—running and weak—temperature 99·6—face drawn. She seems much worse." On September 8th she was still worse, with a pulse rate of 140, temperature 102°, and constant vomiting. On September 9th I was wired for, and, catching an early train, found the patient apparently dying of acute peritonitis. The abdomen was distended with fluid, the temperature was falling, and the pulse was getting quicker and quicker.

We determined to operate. On opening the abdomen, after giving only a few whiffs of chloroform, a large quantity of slightly purulent fluid escaped, and the cyst came into view. It was quickly emptied of its contents, which consisted of clear fluid, and drawn out through the wound, the only adhesions present being very recent. The pedicle was secured, and, on cutting through it, a gush of pus escaped from the Fallopian tube. The left ovary was found to be normal, and the wound was closed immediately and as quickly as possible. I made no attempt to remove the peritonitic fluid which remained in the abdominal cavity after the removal of the cyst; indeed, no

sponge or swab was introduced through the wound at any stage of the operation. Neither was any attempt at drainage made, the wound being closed and sealed up with celloidin at once.

The patient rallied during the afternoon, and the next day her pulse was 84 and her temperature 99·5. There was no pain or vomiting from the time of the operation onwards. The temperature chart indicated that her recovery was quite uneventful. She has remained perfectly well up to the present date.

The tumour consisted of a unilocular cyst about the size and shape of a "Rugby" football. There was a solid mass of myxomatous tissue the size of a hen's egg at the free end; it was this which felt like a fœtal limb on palpation. Close to the pedicle was a solid mass the size of a fœtal head, which also consisted of myxomatous tissue. This it was which felt like a fœtal head lying in the hypogastric region. The tumour represented the right ovary, and the enlarged Fallopian tube was stretched over its surface.

The case presents several features of interest. The diagnosis, to begin with, was not easy, and the subsequent clinical history did not at first sight tend to confirm it. A little thought, however, made it clear that the sequence of events was somewhat as follows. To begin with, the growth of the cyst was doubtless favoured by the gestation which began in the month of April. The enlargement of the uterus caused rupture of the cyst, which occurred on July 26th, accompanied by syncope and the disappearance of the abdominal swelling. The rupture of the cyst caused abortion, which was incomplete. This caused bleeding and permitted of septic infection of the uterus, which was relieved by the treatment the patient received in the hospital. Pus, however, was left in the right Fallopian tube, for the temperature remained irregular until I saw her on September 5th. My examination on that day was followed by peritonitis, doubtless because my manipulations squeezed pus from the tube into the peritoneal cavity. This view was confirmed when, on dividing the pedicle, pus flowed from the cut end of the tube.

It may be asked why I attempted no peritoneal toilette and why I did not use drainage. My reasons were as follows.

It was clear that the patient's extreme condition on September 9th was due not so much to septic intoxication as to mechanical disturbance due to the cyst and the free fluid in the abdomen. She had already been in a thoroughly septic condition for at least a month, and her power of dealing with septic poison was therefore obviously good. If she died after the operation it would be of shock, not of sepsis. I therefore avoided shock by operating as quickly as possible, by putting not even a sponge in contact with the viscera, and by closing the wound without inserting gauze or a drain tube. I also treated shock, not by intra-venous, subcutaneous, or intra-peritoneal injection of saline fluid, but by leaving in the abdominal cavity a large quantity of its own secretion, the peritonitic fluid. That this was quickly reabsorbed and that it did no harm is clear from the after history, which indeed fully justified the somewhat unusual course pursued at the operation.

ON THE DIAGNOSIS OF TWINS FROM ABDOMINAL EXAMINATION

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A DIAGNOSIS of twins can readily be made by abdominal examination. It is evident that abdominal palpation is little practised from the fact that the ante-partum diagnosis is seldom certain enough to induce the making of preparations for the arrival of more than one child. It is usually when the placenta is to be expelled that the presence of another child is discovered.

Mundé asserts that the diagnosis is only possible after a combined internal and external examination. (One head is found presenting, while there is another in the abdomen, and where the abdomen is large, while the presenting part is small.)[1]

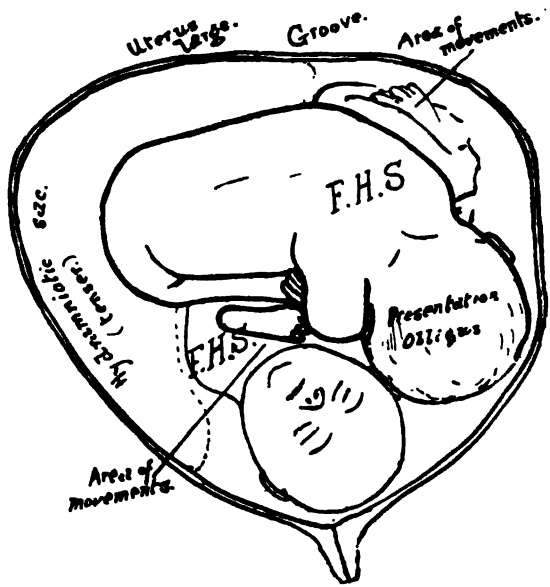
The diagnosis may be made from the following data elicited by—

1. *Inspection.*—The presence of twins is occasionally surmised, if the abdomen happens to be observed at all, from its

[1] Mundé, *American Journal of Obstetrics*, vol. xii., 1879.

excessive size. Sometimes the presence of fœtal movements, occurring at widely separated areas, may be helpful in arousing a suspicion of the condition.

2. *Palpation.*—It is from the practice of this that the presence of twins can be most easily recognised. The shape of the uterus may be unusual. There may be a groove at the fundus, as has been pointed out by Küneke,[1] or the conformation of the uterus may be irregular. The visible increase in size noted under the first head may be due to hydramnios alone,



F.H.S. Areas of Fœtal Heart Sounds.

or if the ova are in different sacs, hydramnios may be present in one, while the other is normal.[2] The presence of an excess of liquor in one sac may also sometimes account for the abnormality in the shape of the uterus. The tenseness in one sac may be different from that of the other, different parts of the uterus being of unequal resistance.

Fœtal movements, produced by more than one set of limbs, and felt at different places, are also more or less characteristic.

[1] Küneke, "Ueber das Erkennen der Zwillings-schwangerschaft." Gottingen, 1861. *Monatsschrift für Geburtskinde*, Bd. xxi-xxii., S. 319.

[2] Pinard, "Traité du Palper Abdominal au point de vue obstétrical." Deuxième édition. Paris, 1889.

The observation of two sets of limbs, more than two poles, or two trunks, gives evidence of twins. Finding an oblique presentation, where the one pole does not permit itself to be pushed into the pelvis, should make the examiner aware that there is some other mass already in the pelvis, or that there is a disproportion between the size of the presenting part and the pelvis. Contracted pelvis, hydrocephalus, prolapsed tumour, placenta prævia, short cord, or twin pole should be thought of, and a differential diagnosis attempted.

(*a*) Contracted pelvis, if the woman be a multipara, will be indicated by the history, or in the presence of deformity elsewhere, lameness, etc., in high position of the uterus, and in the facility with which the presenting part may be displaced to the opposite side, etc.

(*b*) Hydrocephalus is self-evident if of a marked type, and if the head presents, its size can be estimated as it sits over the pubis. Where the breech presents, the progress of labour is not interfered with till the after-coming head attempts to engage. In breech presentations, especially in primiparæ, hydrocephalus should be particularly looked for.

(*c*) Prolapsed tumour will give the signs of obstruction in the pelvis, but the rest of the supposed twin will be conspicuous by its absence.

(*d*) Placenta prævia usually gives notice of its presence by the advent of unavoidable hæmorrhage. Where placed anteriorly, it masks the presenting part, and may also be recognised on account of its peculiar consistence.

(*e*) Short cord preventing engagement, as a rule, does so only before rupture of the membranes. It gives the sign of contracted pelvis where the head ballotts freely over the brim, but the auscultation signs are characteristic.

An internal examination will be necessary in any case by way of treatment, so the provisional diagnosis can be confirmed then. The presence of a dead and atrophic twin ovum will be, most likely in every case, impossible of diagnosis by abdominal examination; as also by internal.

3. *Mensuration.*—The enormous size often attained by the uterus containing more than one ovum is remarkable. It is due commonly, as referred to already, to the presence of hydramnios in one or both sacs. The normal girth of a pregnant woman's

abdomen (at the level of the umbilicus) is about 36 inches (Herman).[1] A large increase in this measurement is to be noted as pointing toward hydramnios pure and simple, or to multiple pregnancy. Ahlfeld [2] has pointed out that if two fœtal poles are found separated from each other by more than 30 cms. (11¾ inches), then these two poles cannot belong to the same fœtus.

4. *Auscultation.*—Two areas of maximum intensity of the heart sounds, separated by an area of silence, point towards there being more than one ovum. Hearing, however, two fœtal hearts having different rhythms, is conclusive evidence. The counting of two rates is not sufficient to give rise to more than a suspicion. Where, however, the hearts are heard beating together but with different rhythms, there is no question about the condition. A double stethoscope is most useful in this connection.

Very much the same reasoning refers to the diagnosis of triplets. In both, owing to the exaggerated size of the abdomen, an error may arise regarding term, but delivery takes place commonly before the calculated time.

The various points may be noted in the diagram, which represents an actual case, slightly modified so as to illustrate all the points in the diagnosis.

AN UNUSUAL FORM OF CYSTOCELE AS A COMPLICATION IN THE LAST MONTH OF PREGNANCY

By JAMES ORR, M.B., Ch.B.
St Andrews

THE condition about to be described is the warrant for the publication of the following case, which occurred while I was resident in Dundee Royal Infirmary.

The history is as follows :—

Mrs M., aged 38, was admitted on October 29th, 1900, in the ninth month of her second pregnancy. This had

[1] Herman, *Clinical Journal*, Aug. 1, 1900.

[2] Ahlfeld, "System of Gynæcology and Obstetrics by American Authors," vol. i. pt. i. p. 56.

been uneventful, except for some frequency of micturition in the three weeks preceding the day of admission, when, at 5 P.M., she suddenly felt something coming down in front, and had down-bearing pain and difficulty of micturition. She went to Dr Gray, of Dundee, who sent her at once to hospital. When Dr Gray saw her, there was a soft mass protruding from the vulva. On admission the labia were somewhat œdematous, but nothing else was noticeable on inspection.

The vaginal orifice was rather patulous, and immediately on entering the vagina a mass resembling a thick umbilical cord, or a loop of bowel with thickened wall, was felt. It could be traced on either side to the anterior vaginal wall, with which it was continuous. It began at the base of the urethra below, and on being traced upwards was found to contract and again to expand into a second fold below the cervix, which could not at first be reached.

Later in the evening Dr Buist confirmed this condition, and on passing a sound through the urethra found it enter the upper protrusion which filled the anterior fornix. Careful exploration with the fingers of the left hand in the roomy vagina showed that the two protrusions were pouches of the bladder, separated by an area of relative constriction. The condition was, in fact, an hour-glass form of bladder, of which each bulb formed a cystocele.

Abdominal palpation showed that the fœtus lay vertex down, and back to right. The cardiac and respiratory systems were normal, but the patient was somewhat anæmic. There were no labour pains. Patient was ordered to be kept steadily in bed.

On November 6th the fœtus was lying back to left, and this position continued throughout the remainder of pregnancy. Vaginal examination now showed a longitudinal but small protrusion of the anterior vaginal wall, but no differentiation into two sacs could be made. She had no difficulty of micturition.

On November 14th she went home for domestic reasons, but returned the next day in the first stage of labour. The membranes had ruptured before she was examined. The presentation was O.L.A. There was some protrusion of the anterior vaginal wall, and this became more marked with each

pain. It was gently pushed upwards till the head was born, which occurred ten minutes after the rupture of the membranes. The placenta was born in twenty minutes, and afterwards nothing but laxity of the anterior vaginal wall could be made out. The convalescence was absolutely normal, there being at no time pain, or frequency of micturition. On November 24th the bladder was examined through a large Kelly speculum. The mucous membrane was normal, and the cavity showed no trace of sacculation. The patient went home the same evening.

A case somewhat similar to the above has been recorded by Dr Whitham, of Haworth.[1] In this case the symptoms, closely resembling those described, occurred on the nineteenth day before the onset of labour. The labour was more complicated in this than in the preceding case, the persistent protrusion of the tumour necessitating postural treatment in the knee-elbow position, in addition to manipulation.

These two cases, though possessing many points of similarity, are distinguished from each other by the fact that in the former there was a distinct *sacculation* of the bladder. In the latter case there was no evidence of the existence of this condition.

Sacculation of the bladder is somewhat rare, and in most cases is due to a hernia of the mucous membrane through a weak part of the muscular wall. Mrs M.'s case does not fall into that category. At the end of pregnancy, according to Auvard, the bladder may have one of three forms. (1) Most commonly it is an abdominal organ, with elongated urethra. (2) It may be entirely pelvic and cruciform, expanding round the cervix. (3) It may be partly pelvic and partly abdominal, the intermediate area being compressed between the uterus and the pubic bone.

The case would correspond to a bladder of the last form of which the upper pouch had suddenly been forced into the pelvis. Whether this were its mode of origin or not, the condition was at first somewhat puzzling, and, as a complication of pregnancy, is of considerable interest.

(I am indebted to Dr Buist, Dundee, for permission to publish this case.)

[1] *Brit. Med. Journ.* 1883, vol. i. p. 987.

THE FOOD REQUIREMENTS OF VARYING LABOUR[1]

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ALL authorities are agreed that the more severe the labour, the greater is the food requirement of the workman; but at present the amount of the increase of food necessary to supply the wants of greater work is far from settled. To assist in the elucidation of this point I venture to describe some dietary studies which I have recently been able to make in the Scottish Prisons. For the purposes of dietary study probably no institutions are so well adapted as cellular prisons. The inmates are kept under constant observation, their food supply is very strictly limited and accurately divided, and their labour strictly fixed and insisted on. Many details of my prison studies have already been published in "Report on Prison Dietaries," Parliamentary Report C9514, 1899,[2] and in "Further Report on Prison Dietaries," published as an appendix to "Minutes of Evidence, Prisons (Scotland) Enquiry Committee," Parliamentary Report C218, 1900.

Of the many dietary standards advanced during the last half century two deserve special consideration; as these two differ very essentially, my object in this paper will be to criticise them and try to show which of them more nearly approaches correctness. The two standards I refer to are those of Voit[3] and of Atwater.[4] Voit's series of standards was founded on studies made by himself and others. It was formulated fully 25 years ago, and has since then been adopted, either entirely or with very slight modification, in all text-books; its accuracy has until now never been seriously questioned. Atwater's series of standards, which he has only announced tentatively, is like Voit's series, the outcome of original work. It was founded on the results obtained from a

[1] Communicated to Physiological Section, 13th International Medical Congress, Paris, 1900.

[2] Also published in Laboratory Reports of the Royal College of Physicians, Edinburgh, vol. vii., 1900.

[3] Voit Hermann's Handbook, Bd. vi., 1881.

[4] Atwater, U.S. Department of Agriculture, Office of Experimental Stations, Bulletin 21, 1895.

long and trustworthy series of dietary studies conducted by him and his fellow-workers in America. The differences between Voit's and Atwater's standards are shown in Table I. In it the dietaries are for simplicity expressed as to their proteid and energy values only, a method adopted by Atwater. The energy values of Voit's diets are calculated by Rubner's formulæ.

Table I—COMPARING STANDARDS OF VOIT AND ATWATER.

Diets.	Voit.		Atwater.	
	Proteid. Grammes.	Energy Value. Calories.	Proteid. Grammes.	Energy Value. Calories.
Rest	85	1860	100	2700
Light Labour[1]	(100)	(2570-2770)	112	3000
Moderate	118	3055	125	3500
Severe	145	3370	150	4500

In the table the essential differences between these two series of standards will be seen. Atwater considers a much larger amount of food necessary for an idle man, 50 per cent., than Voit does, and Atwater considers that larger increments are necessary as the severity of the labour increases than Voit. Voit's severe labour diet is only 26 per cent. more than his light labour diet. Atwater's is 50 per cent. more than his light labour diet.

One great difficulty in discussing the food of varying labour is to classify labour with any exactitude. This difficulty is thoroughly appreciated by Atwater. In pointing out the difference between his standards and Voit's, he states that the more generous American diet may be due to the "scale of living or standard of life" being higher there than in Europe.[2] In stating that, he implies that the American conception of moderate labour is more than the European conception. Whether this is so or not it is impossible to say exactly. We are unpossessed not only of estimations of the work done

[1] (Light labour standard is not given by Voit. The figures quoted are from Munk & Uffelmann's text-book, page 208. They are founded on the observations of Voit and his fellow-workers.)

[2] U.S. Board of Agriculture, Office of Experimental Stations, Bulletin 21, page 211.

by an average labourer, but also of means to accurately classify labour. In view of this difficulty a classification of prison labour into light, moderate and severe cannot be made dogmatically, but I am of opinion that the labour of the Scottish prisons can be classified as light and moderate labour, and my reasons for this opinion are as follows:—

A. The work exacted from the ordinary prisoner may be considered as light, because

(1) Most of it is sedentary. Much of the prison work consists in teasing rope and oakum, in mat making and other work which does not entail severe bodily exercise.

(2) The ordinary prisoner spends more of his time resting in bed than an ordinary labourer. His night's rest in bed is ten hours. The free labourer's is about seven hours.

(3) The most severe task extracted from them, stone-breaking, is very much less than a day's work of a free labourer at the same employment. A free labourer breaks 40 to 60 cubic feet of stone daily; an ordinary prisoner from 10 to 17 cubic feet.

(4) Prisoners in conversation have practically unanimously told me that their prison work is not so severe as the labour they perform when free. Dock labourers, miners, seafaring men, and many others have all told me this.

B. The work extracted from convicts may be taken as moderate labour, because

(1) Their day's work is short, never exceeding eight hours a day.

(2) Their rest is long. They spend about nine hours out of the twenty-four in bed.

(3) Their stone-breaking task, 27 cubic feet, is much less than that of a free labourer—40 to 60 cubic feet.

Voit describes moderate labour as equivalent to nine to ten hours a day of the work of a man in condition employed as a builder, carpenter or soldier. Compared to that description the work of the convict cannot be considered as more than moderate labour; and the work of the ordinary prisoners, being less than that of the convict, as light labour.

For each form of labour I have been able to study the sufficiency of a series of diets of varying value. I shall describe each separately.

Light Labour Diets.

In the Scottish prisons at the time of my dietary studies there were in use four diets for ordinary prisoners, *i.e.* for prisoners doing what is essentially light labour. These four diets were styled Rates I., II., III. and IV. The energy value of these diets were 1718, 2100, 2715 and 3115 calories. The sufficiency of Rate I., 1718 calories, was not tested; it was never given for more than three days, and consequently there was no opportunity for making satisfactory observations. The sufficiency of Rates II., III. and IV. was studied. Rate II. was the regulation diet of prisoners with sentences of less than one month; Rate III. for prisoners with sentences of less than four months; and Rate IV. for prisoners whose sentences were more than four months. Two years in Scotland is the maximum sentence of ordinary imprisonment, and consequently it was the longest period during which a prisoner was dieted on Rate IV.

The composition of the diets was determined by analysis; details are given in "Report on Prison Dietaries."[1] Rates II., III. and IV. all consist of an allowance of porridge and buttermilk night and morning, and at mid-day an allowance of broth and bread, or potato and bread, or in some instances fish and bread. Their composition is shown in Table 2.

Table 2—SHOWING COMPOSITION OF PRISON LIGHT LABOUR DIETS.

	Proteid. Grammes.	Fat. Grammes.	Carbohydrate. Grammes.	Energy Value. Calories.
Rate I. . . .	59·5	8·9	339·5	1718
Rate II. . . .	91·5	25·5	362·5	2100
Rate III. . . .	117·8	32·8	470·5	2715
Rate IV. . . .	134·6	35·5	535·5	3115
Voit's Light Labour[2]	(100)	(56	400-450)	(2570-2770)
Atwater's "	112			3000

In Table 2 it will be seen that of four diets one only, Rate IV., fulfils the requirements of Atwater's standard; while two of them, Rates III. and IV., fulfil the requirements of Voit's standard, allowing that Munk and Uffelmann's estimate

[1] *Loc. cit.* pages 39 to 42. [2] See Table 1.

fairly represents Voit's finding. The observations on Rates II., III. and IV. will be stated separately.

Rate II.—2100 *Calories.*

The sufficiency of this diet was tested in two ways: by metabolic observation, and by weight records.

Metabolic observations.—These were made on two prisoners "A" and "B." The duration of the observations were in both cases five days. The results of the observations are shown in Table 3; in it the figures represent the average amount per diem.[1]

Table 3—METABOLIC STUDIES WITH RATE II. DIET—2100 CALORIES.

	Urine.		Fæces Nitrogen. Grms.	Total Excreted Nitrogen. Grms.	Nitrogen Intake. Grms.	Nitrogen Balance.
	Quantity. c.c.	Nitrogen. Grms.				
A	4935	13·87	2·46	16·33	14·81	- 1·52
B	2935	12·69	1·53	14·22	14·81	- ·59
Average	3935	13·28	2·00	15·28	14·81	- ·47

It will be seen in Table 3 that of the two prisoners observed, the one lost nitrogen at the rate of 1·52 grammes per diem; the weight of that man when received in prison was 67 kilogrammes. He was losing weight at the rate of nearly 2 kilogrammes per week. The other prisoner, "B," was practically in nitrogenous balance. He was a small man, weighing 57 kilogrammes. He had maintained his weight for the fourteen days that elapsed from his reception to the end of the observation period. From the observation on "A" and from the average of "A" and "B" there is evidence that Rate II., 2100 calories, is insufficient to keep a lightly worked man of average size in nitrogenous equilibrium.

Weight records.—A scrutiny of the weight records of prisoners dieted on Rate II., 2100 calories, fully corroborated the result got from the metabolic observations. The average sized prisoners doing light work, if restricted to the diet for

[1] Full details of these and following metabolic studies in "Report on Prison Dietaries," pages 46-53.

more than fourteen days almost invariably lost weight. From my own observations of forty-eight prisoners restricted to this diet for from three to four weeks I found forty-four, 92 per cent., to lose weight to an average of nearly 2 kilogrammes.[1] Even that statement does not show the true loss of weight. Observation has shown that there is almost invariable gain of weight during the first three days of imprisonment, the gain amounting on an average to 1·5 kilogrammes;[2] if that is calculated for, then the loss of weight appears to be universal and to amount on an average to about 3·5 kilogrammes. The initial rise of weight in prison may be attributed to the sedentary life limiting the sensible perspiration of the prisoner; this tending to produce an accumulation of water in the system, and thus producing an apparent increase of weight.

The two modes of study, metabolic observations and weight tests, corroborated each other, and showed that a diet containing 91·5 grammes of proteid, and having an energy value of 2100 calories, was insufficient to meet the requirements of a man doing light labour.

Rate III.—2715 *Calories.*

The sufficiency of this diet was tested in the same two ways.

Metabolic observations.—These were made on three prisoners, "C," "D" and "E." "C" was observed four days, "D" and "E" were both observed six days. The results are shown in Table 4.

Table 4.—METABOLIC STUDIES WITH RATE III. DIET—2715 CALORIES—AVERAGE PER DIEM.

	Urine.		Fæces Nitrogen. Grms.	Total Excreted Nitrogen. Grms.	Total Nitrogen Intake. Grms.	Nitrogen Balance.
	Quantity. c.c.	Nitrogen. Grms.				
C	3162	14·89	3·81	18·70	19·55	+ ·85
D	3671	17·76	3·14	20·90	19·30	−1·60
E	3426	16·23	3·24	19·47	19·30	− ·17
Average	3420	16·29	3·40	19·69	19·38	− ·31

[1] Report, page 53. [2] Report, page 56; and Further Report, page 42.

These metabolic observations show in one case out of three observed a decided negative balance, in one case a small positive balance, in the third nitrogenous equilibrium. The average of all three observations shows a small negative balance and thus shows that the diet was insufficient. All these sets of observations were made on prisoners of small size. "C" weighed 55 kilogrammes, "D" 57 kilogrammes and "E" 55 kilogrammes. Had the prisoners been of average size, 67 kilogrammes, the results doubtless would have been more decided.

Weight records.—With this diet a scrutiny of the weight records gave results which corroborated those obtained from metabolic observation. It was found that excluding very small men, less than 56 kilogrammes in weight, that nearly 70 per cent. of the prisoners lost weight when restricted to this diet. If allowance is made for the initial rise after reception already referred to, then 85 per cent. of all the prisoners, small men included, lost weight to an average of 2·4 kilogrammes.[1] In Table 5 is shown a resumé of the observations of the effect of Rate III. diet on prisoners of different weight. In that Table no allowance is made for the initial rise after reception.

Table 5.—WEIGHTS OF PRISONERS RECEIVING RATE III. DIET—2715 CALORIES.

Weight of Prisoners.	Number observed.	Number losing.	Per Cent. losing.	Average Loss by Losers. Kgrams.
Under 56 Kilogrammes (9 stone)	27	3	11	·7
Between 62 and 68·5 Kilogrammes (10-11 stone)	43	27	63	1·7
Over 75 Kilogrammes (12 stone)	7	5	70	2·2

The marked difference found between the weight records of the average and large men and the weight of small men, is good proof that Rate III. diet—2715 calories—is insufficient for both average and large prisoners.

[1] Report, pages 56 and 57.

Rate IV.—3115 *Calories.*

The same two methods of observation were employed, metabolic observations and scrutiny of weight records.

Metabolic observations. — These were made on three prisoners, "F," "G" and "H." "F" was observed for five days, "G" and "H" both for seven days. The results of the observations are shown in Table 6.

Table 6.—METABOLIC OBSERVATIONS WITH RATE IV. DIET—3115 CALORIES.

	Urine.		Fæces Nitrogen. Grms.	Total Excreta Nitrogen. Grms.	Nitrogen of Intake. Grms.	Nitrogen Balance. Grms.
	Quantity. c.c.	Nitrogen. Grms.				
F	3470	16·82	4·93	21·75	22·65	+·90
G	3887	18·89	3·72	22·61	22·26	−·35
H	3532	18·20	4·87	23·07	22·26	−·81
Average	3630	17·97	4·51	22·48	22·39	−·09

It will be observed in this Table that of the three observed, one, "F," was retaining nitrogen; a second, "G," was practically in nitrogenous equilibrium; while the third, "H," was losing a small quantity of nitrogen daily. The weight records of these three prisoners showed that "F" was gaining slightly in weight during the period of observation; that "G" was maintaining his weight; and that "H" lost some weight, ·45 kilogrammes, during the period. With the prisoners dieted by Rate IV. no serious negative balance such as observed with those dieted by Rates II. and III. was observed. From these metabolic observations it appeared that Rate IV. was sufficient to nourish the ordinary prisoner.

Weight records.—With this as with the previous two diets, a scrutiny of the weight records corroborated the results obtained from metabolic observation, for it was found that with this diet—3115 calories—all except the largest prisoners maintained their weight. The result of the scrutiny is shown in Table 7; in it, as in Table 5, prisoners whose weights were intermediate to the weight named were omitted.

Table 7.—WEIGHT RECORDS WITH RATE IV.—DIET 3115 CALORIES.

	Number observed.	Number losing.	Per Cent. losing.	Average Loss by Losers.
Under 56 Kilogrammes (under 9 stone)	29	3	10	2·6
Between 56 and 68·5 Kilogrammes (10-11 stone)	33	5	15	2·6
Over 75 Kilogrammes (over 12 stone)	7	5	70	6·2

Conclusions regarding Light Labour Diets.

A comparison of the results obtained from the study of the three diets is shown in Table 8. In that Table the weight records of prisoners of average weight, *i.e.* 56 to 68·5 kilogrammes, only are included.

Table 8.—LIGHT LABOUR DIETS.

Diet.	Calories.	Nitrogen Balance Average.	Weight Record. Per cent. losing.	Conclusion.
II.	2100	−·47	92	Insufficient
III.	2715	−·31	63	Insufficient
IV.	3115	−·09	15	Sufficient

As stated in Table 8 only one of the three diets, *the one with an energy value of* 3115 *calories, was found sufficient to properly nourish the average prisoner doing light work.* Consequently these prison studies have given results which corroborate the opinion of Atwater, that a diet worth at least 3000 calories is necessary for light labour.

Moderate Labour Diets.

Three diets for prisoners doing moderate labour were observed. At the time I commenced my studies a diet worth 3928 calories was given: this was found to be wasteful, and another diet worth 3525 calories was tried; this second diet was found insufficient, so a third diet worth 3707 calories was tried. These three diets I shall refer to as A, B and C.

Three food values are given in Table 9, where also Voit's and Atwater's standards are for comparison included.[1]

Table 9.—MODERATE LABOUR DIETS.

Diet	Proteid. Grammes.	Fat. Grammes.	Carbohydrate. Grammes.	Energy Value. Calories.
Voit's Moderate Labour .	118	56	500	3055
„ Severe „ .	145	100	450	3370
Atwater's Moderate Labour	125	...	...	3500
„ Severe „ .	150	...	...	4500
Prison A	179	54	654	3928
„ B	165	56	566	3517
„ C	173	57	602	3707

Three tests were used for ascertaining the sufficiency of the three, A, B and C, the weight records, on the amount of waste or return food, and the amount of complaining. The distance from the laboratory to the prison where these diets were in use was great, and prevented metabolic observation.

Tests of Sufficiency of Diet A.—3928 *Calories.*

(1) *Weight records.*—The application of this test for the sufficiency of a diet with an energy value of 3928 calories demonstrated that with it the prisoners were receiving sufficient food, for the vast majority, even when restricted to it for years, maintained their body weight. Small fluctuations occurred both in the individual records and in the average weight of groups of prisoners, but all the records were such as to show that the minority losing weight was as small as it reasonably could be expected to be.[2]

(2) *Complaints.*—While this diet of 3928 calories was given there were constantly some complaints; but these complaints were not of the nature to indicate insufficient feeding, but rather the reverse of that, for the principal faults found by the prisoners with the diet were not they were not getting sufficient, but that the food was not good enough. They complained of the less savoury dinners; they did not appreciate a suet pudding dinner, nor a fish dinner, nor a dinner of broth and bread. These dinners were at all events wholesome,

[1] Details of diets in Report, page 101; and Further Report, page 44.

[2] See Report quoted, pages 92-96.

though perhaps not very savoury, so that the deduction to be got from the complaints was that the prisoners were receiving more food than they required, and had not relish for all their meals.

(3) *Waste.*—With this large diet a very considerable waste occurred; and as might be expected, the waste or returned food consisted almost entirely of the less savoury articles of diet. The waste of porridge and bread was considerable; that of suet pudding, of fish and of broth large (20 to 25 per cent.); while that of fish soup was very large, fully half of the issue. This examination fully corroborated the conclusion derived from the consideration of the nature of the complaints, that the prisoners were not only receiving sufficient food, but were receiving more food than they required.

Tests of the Sufficiency of Diet B.—3517 *Calories.*

(1) *Weight record.*—The record of weights during the two months' trial of this diet showed a great difference from what had been the case; for instead of the great majority of the prisoners maintaining their weight, a very large proportion of them were found losing weight, in fact, no less than 82 per cent. of the prisoners of average size at so-called hard labour distinctly lost weight during that time. Such a record as that was by itself strong evidence that the diet was insufficient.

(2) *Complaints.*—The complaints during the trial of this smaller diet were very different from what they were with the original larger diet. They were both much more numerous and of a very different character. They were being made by the prisoners daily; they were of a pitiable description, not complaining of the quality of the food as had formerly been the case, but complaining of symptoms of want of food, of genuine underfeeding: feeling faint when at work, no energy, and sleeplessness at night. The complaints were undoubtedly genuine. They also were a proof that the diet was insufficient.

(3) *Waste.*—The record of waste during this test shows that the excessive waste which was found with Diet A. was completely abolished, and that the waste was reduced to very small proportions, as small as could reasonably be expected, for the largest remaining waste, that of porridge, amounted only to about 5 per cent. of the issues.

Tests for the sufficiency of Diet C.—3707 Calories.

(1) *Weight.*—The record of the prisoners' weights during the trial of this diet was very different from what it was during the trial of Diet B; for instead of there being 82 per cent. of the prisoners at hard labour losing weight, only 24 per cent. did, the great majority, 76 per cent., maintaining or increasing their weight. The weight test for the sufficiency of Diet B with its 3517 calories was unsatisfactory; but the weight test of Diet C with its 3707 calories was most satisfactory, and afforded strong evidence of its sufficiency.

(2) *Complaints.*—Again in this instance the amount of genuine complaining was parallel with the weight record, for with improving weight records the complaints of insufficient feeding practically entirely stopped. During the trial of Diet B, the record of complaints showed that some hundreds had been made; during a corresponding period of the use of Diet C, hardly a complaint with any semblance to genuineness was made.

(3) *Waste.*—The waste with this diet may be described as no more than it was with the smaller diet, and much less than with the larger, the original diet. In the following Table is shown a resumé of the more important wastes found during the dietary trials; it will be seen how great the difference is between the waste from Diet A, and from Diets B and C.

Table 10.—SHOWING WASTE FROM MODERATE LABOUR DIETARIES. QUANTITIES EXPRESSED AS PER CENT. OF ISSUES.

	Diet A Waste. 3068 Calories.	Diet B Waste. 3517 Calories.	Diet C Waste. 3707 Calories.
Porridge	12	57	4·8
Bread	4 / 10 [1]	3·3	3·7
Fish	30	...	...
Beef	?	·5	1·0
Fish Soup	30	...	...
Sunday Soup	25	3	·4
Potato	?	20	70[2]
Cabbage	...	50	80

[1] On days when 20 per cent. bread was wasted, the issues were larger than when 4 per cent. was wasted.

[2] Larger waste to be ascribed to falling off in quality of vegetable due to lateness in season.

Conclusions regarding Moderate Labour Diets.

From the observations on the sufficiency of these three diets for moderate labour it may be concluded that a diet of 3500 calories was insufficient, one of 3900 was excessive, while one worth 3700 was sufficient but not excessive. In Table 11 a comparison of these observations and conclusions is shown.

Table 11.—SHOWING TESTS OF MODERATE LABOUR DIETS.

Energy value of Diets.	Weight Records per cent. losing.	Complaints.	Waste.	Conclusions.
3517	82	Many of quantity	Small	Insufficient
3707	23	None	Small	Sufficient
3928	25	Some of quality	Excessive	Excessive

Applying these conclusions to the question enunciated earlier, viz., which of the two standards, Voit's or Atwater's, is more correct, the answer here, as with the diet for light labour, is strongly in favour of Atwater's standard, as it appears that the more generous diet allowed by him for moderate labour is not excessive. In these prison studies, large numbers of men were observed; three diets of slightly varying value but of very similar composition were given; and the results obtained were very marked. The diet worth 3500 calories was insufficient, and from that it follows that a diet of 3055 calories, Voit's standard, would be far less than sufficiency.

It might be urged that these studies contradict Atwater's standard. He states 3500 calories as sufficient food for moderate labour, these prison studies show that for convict labour 3500 was insufficient, while 3700 was necessary. But this I consider does not amount to a contradiction, because the term moderate or middle labour is ambiguous. I have stated my reasons for considering convict labour to be moderate, but I fully allow that moderate labour is not a fixed quantity, and that consequently some latitude should be made as to the standard; and if that is done, then both Atwater's standard, and the more generous addition of food allowed by him for increasingly severe labour, may be considered as correct.

Allowing the ambiguity of the term moderate labour and allowing that a latitude of standard to meet that ambiguity, two questions arise: the first, whether there is a definite food requirement for a definite amount of work; the second, whether it would be right to fix diets for moderate labour from standards.

An answer to the first of the questions is obtainable from these prison studies. The observations were made on large numbers and were arranged so that individuals of exceptional requirements were excluded; by such individuals I refer to those of exceptional size, and those losing weight from well-defined reasons such as dietary, punishment and illness. The result of the observations was most striking; the difference between diets B and C was a daily allowance of 74 grammes of bread, 190 calories, while this result of the small change was practically universal. This result clearly implies that all average men doing the same amount of work require the same amount of food, that individual variation is very small, and that there does exist a common food requirement.

The other question can also be answered from my prison studies. These studies have throughout corroborated Atwater's standards, but the mistake of attempting to fix a diet arbitrarily from a standard was made very evident by the trial of Diet B. The labour was essentially moderate, the diet fulfilled the apparent conditions of Atwater's standards, and yet it was insufficient to properly nourish the men. The fixation of a proper diet for labour from standards is, I consider, at present impossible, and is so because we are unable to estimate the severity of the labour. My opinion is that with our present knowledge of dietetics the only way of satisfactorily adjusting diets is by direct observation.

It may be accepted that an average man at light labour requires a diet of 3100 calories; that if the labour is more than light he requires more food; that the increments to meet the wants of moderate labour may amount to about 20 per cent., and that those for severe labour perhaps to 50 per cent. of the light labour diet (Atwater). But, accepting these figures as correct, we are still unable to adjust a diet to meet the requirements of moderate or severe labour from standards, because we are unable to estimate with even approximate accuracy the severity of labour tasks.

THE SPHYGMOGRAPHIC APPEARANCES OF THE PULSE IN INFANCY—A PRELIMINARY NOTE

By H. OLIPHANT NICHOLSON, M.B.,
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IN 1886 Ozanam (1), in his work on the pulse, describes the sphygmographic tracing obtained from the new-born infant as a simple uniform undulation, which shows a slowly rising line of ascent during cardiac systole, and an equally gradual decline during diastole. Each cardiac cycle thus represents a regular wave, as in Fig. 1, where the middle of the curve marks the

Fig. 1.—Pulse of the new-born Infant (Ozanam). (Incorrectly called *Monocrotic.*)

height of the ventricular systole. These characters remain the same from birth until the age of one year. Further, he states that it is not until the seventh or eighth year of life that a definite apex or percussion wave is shown in the tracing, and that there is no appearance of the dicrotic wave till the child is from ten to fourteen years old.

Keating and Edwards (2), in 1888, state that the most important peculiarity of the child's pulse revealed by sphygmographic tracings is, that *dicrotism is absent*, and does not appear until the age of ten or fourteen years is reached. They give five tracings taken from a thesis by Blache, which show the gradual transitions in the pulse wave from the age of three

Fig. 2.—Pulse of a Child æt. 4 years (Blache).

years, and the last tracing from a child fourteen years old shows the characters of a dicrotic pulse. Fig. 2 is Blache's tracing from a child aged four years.

All these tracings closely resemble those figured by Ozanam, and suggest that the graphic study of the child's pulse yields nothing more than a wavy line, devoid of all the well-known characters which mark the adult pulse tracing, and from which no useful indications can be drawn.

It is now admitted by most physicians that the graphic study of the adult's pulse, especially when combined with a simultaneous cardiographic record, is often of the greatest value as an aid to prognosis and treatment. The use of such methods in children appears to have been much neglected; and perhaps this is not to be wondered at, if we assume that the sphygmograph can demonstrate nothing more than has been described by Ozanam and others. The general opinion seems to be that the instrument is very unsatisfactory in children; and Goodhart (3) affirms that it cannot even be relied on to show changes in the volume and force of the pulse, and that he has met with little but disappointment from its use.

Ballantyne (4), writing in 1891, predicts that "the results of the sphygmograph in early life will throw much light upon the conditions of the circulatory system both in the healthy and in the diseased infant," and from the impression left upon me by this statement I trace the commencement of my endeavour to study the child's pulse by means of the sphygmograph.

One found it difficult to believe that the pulse of the child, however young, should not possess the same sphygmographic characters as that of the adult, although Ozanam, Keating and Edwards, and others, give reasons which they think explain why the tracing presents the simple form they have described. Their tracings suggest that the instrument employed has not been sufficiently sensitive to register the finer changes produced in the arterial tube by the relatively weak ventricular contraction, and there is distinct evidence in many of the tracings to indicate that the pressure exerted by the spring of the sphygmograph has been too great to allow the feeble pulse wave to record itself correctly.

Towards the end of 1891, while house-physician at a children's hospital, I obtained numerous tracings from children whose ages ranged from two to twelve years, where all the features of the adult pulse were perfectly well marked, and where the variations of pressure within the artery under different conditions were revealed with the utmost precision. In every respect, so far as one can judge, the results obtained were as good and as valuable as are generally acquired from a similar study of the adult's pulse.

After nearly ten years' experience, latterly with much more

perfect instruments, I conclude that this method of investigation in young children will sometimes supply valuable clinical evidence of certain pathological conditions, which the most cultured finger would fail to detect.

Having made this statement, it will be well to give a short description of the method employed in young infants to obtain tracings which adequately represent the course of the blood pressure within the artery, and then to proceed to an interpretation of the sphygmograms.

I have always used a Dudgeon's sphygmograph, and to obtain satisfactory tracings certain points must be attended to. The instrument must be a thoroughly good one; and I give this caution because several which I have examined are of inferior workmanship, and quite unsuited for the purpose. The writing needle, which should be finely pointed, must swing evenly and easily, and the inelastic strap which fixes the instrument to the wrist must be replaced by pieces of elastic band. This simple modification immensely simplifies the process of obtaining successful tracings, for the instrument is very readily applied by tying the two pieces of elastic, and the button can then be adjusted over the artery to a nicety (5). Having got thus far, and obtained a movement of the needle, the next point is to secure the tracing which will most accurately describe the variations of pressure inside the artery.

This is sometimes no easy matter even when one is recording a pulse of good volume, and when dealing with a child of a few days old the difficulties are much greater. Both practice and judgment are necessary to enable one to apply just the requisite degree of pressure to the spring of the sphygmograph to obtain a maximal swing of the needle, for if the pressure be too great, the tracing will not be a reliable one. In almost all cases it should be possible to bring out the percussion wave as a distinct apex to the curve, for a rounded or anacrotic summit generally indicates either too great pressure on the artery, or an inexact adjustment. The pressure applied to the artery by the spring of the sphygmograph in taking tracings from children under a year of age need seldom exceed two ounces, and in new-born infants the index must often register the smallest possible degree of pressure, as even this would sometimes seem to be too great for the strength of the pulse wave, and an in-

correct tracing is obtained. To get the best results in young infants, even the smoking of the papers is a matter of some importance, for if smoked too thickly the smaller elevations in the sphygmogram will not come out distinctly. The papers should be put into the tin holder and smoked lightly and evenly over a piece of burning camphor or an untrimmed oil lamp. Having then described the method in which the sphygmograph may be used, the sphygmograms may be examined.

The first is a tracing obtained from an infant immediately after birth, after the ligature of the umbilical cord, see Fig. 3. It is interesting to commence with a consideration of this tracing, as it most nearly resembles those described by Ozanam and Keating, and also because I think it indicates very beauti-

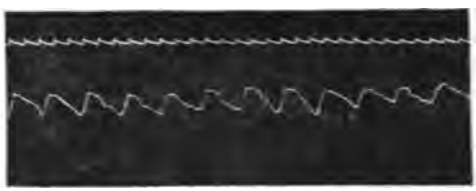

Fig. 3.—Pulse of an Infant after ligature of the Umbilical Cord. (Indicates high tension.)

fully the conditions of the heart and circulation which are generally believed to exist at this early age. In this tracing, taken with the lightest possible pressure on the spring of the sphygmograph, the summit of the systolic wave is somewhat rounded, but the ascent of the up-stroke is not so gradual, and the height of the systole does not occupy the middle of the curve as in Ozanam's figures. The ventricular contraction is apparent as a definite up-stroke, though it is sloping instead of vertical, and in some of the curves a distinct apex appears. The position of the dicrotic notch is easily seen, but the dicrotic wave is poorly represented.

According to Ozanam and Keating and Edwards, a tracing of an infant's pulse indicates *arterial tension*, and shows absence of dilatation.

A pulse with absence of the dicrotic wave is known as "anacrotic." In older children and adults this denotes that the arterial pressure has fallen to a dangerously low point. From a tracing of this type, if it persist, one may almost

always prognosticate a fatal issue, and in the pneumonias of young children I have not so far found a single exception to this. Fig. 4 illustrates the character of the tracing from a child dying of broncho-pneumonia, with a simultaneous record of the respiration. Should an increase in the blood pressure occur in

Fig. 4.—Pulse and Respiration in a case of fatal Broncho-Pneumonia. Child æt. 1¾ years, temp. 102·2, pulse 160, resp. 80. (*Monocrotic* type.)

a case of this kind, the first indication would be the appearance of the dicrotic wave, and this can always therefore be regarded as a most reassuring sign.

My tracings from the pulse of infants are not monocrotic, and the object of the present communication is to show that the pulse of young infants is one of *relatively* high tension, and not of low tension, as held by the authorities already quoted, and that this character is retained during the first year of life. It is necessary to qualify one's ideas of high tension, because the actual blood pressure at this age is, of course, very low ; still it may be *relatively* high, when considered in relation to the factors which maintain it. Sphygmograms from older children add further confirmation to this view, and clearly prove that the tracings of Ozanam, Keating and Edwards, and my own from a new-born baby, may be interpreted as indicating relatively high instead of excessively low tension.

Fig. 5.—Pulse of a normal Infant 6 days old. (Shows the characters of high tension.)

From the tracing shown in Fig. 5 one has conclusive evidence in support of this contention. This sphygmogram, taken

from a healthy boy six days old, brings out very clearly all the points which are characteristic of an adult pulse tracing of high tension. The percussion wave is now more sudden, and the summit of the curve appears as a distinct apex. The tidal wave is developed almost immediately, and is well sustained; the dicrotic notch is situated high up above the base line, and the dicrotic wave is small. These features belong to a high tension pulse, and this tracing may, I think, be taken as adequately representing the appearances found shortly after birth.

Next, I would like to draw attention to the striking resemblance which exists between the sphygmograms figured by Ozanam and Keating and Edwards, and those obtained in aortic stenosis in the adult. The tracing, Fig. 3, from a newborn infant, compares equally well with that from a case of aortic stenosis, and perhaps even more so with the type obtained from some cases of aneurysm affecting the arch of the aorta. The analogy to the latter is, I think, a specially apt one, because the conditions giving rise to this form of pulse wave in both instances are remarkably similar. I refer to the relation which exists between the size of the heart and the width of the aorta, and also to the fact that there is relatively less blood in the arterial system, and hence a smaller pulse at the wrist. Beneke has shown that the volume of the infant's heart is to the width of its ascending aorta as 25 : 50, whereas before puberty it becomes as 140 : 50. There is thus in both conditions a left ventricle connected by a narrow opening with a relatively capacious aorta. On this account the ventricular contraction is slowly developed, and the "shock" imparted to the column of blood at the root of the aorta is, therefore, not a sudden, sharp impact. The result is that the systolic wave in the pulse tracing rises in a sloping direction instead of being a vertical line. Since the arteries are only slightly stretched by the blood driven into them by the ventricular systole, there will be no great variations in the blood pressure, and the factors concerned in the production of the dicrotic wave will not be present to the same extent as they would be in the case of a sharply contracting heart with more distended vessels. Hence the fall of the descending line of the tracing is gradual, and the secondary waves are not well marked.

The features of a high tension pulse are thus delineated in

the tracing from a new-born infant for the same reasons that they are reproduced in aortic stenosis or aneurysm in the adult.

As a further proof of what I have stated, it is interesting to note the effects of pyrexia on the pulse of infants under a year old. In these conditions the percussion wave rises more vertically, the apex of the curve becomes more pointed, and

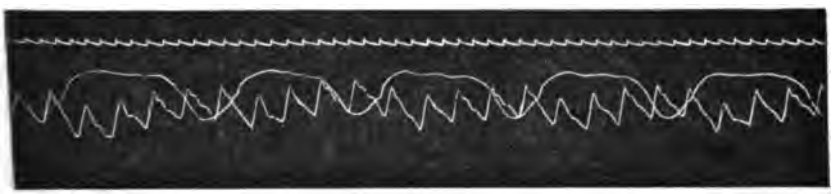

Fig. 6.—Pulse and Respiration in a Child æt. 11 months, during high fever. Temp. 105, pulse 168, resp. 44. (Dicrotism has not been produced.)

the first secondary (tidal) wave is also frequently accentuated. In only one case have I observed its disappearance, and the subsequent rise of a well-marked dicrotic wave, as in a low tension pulse. Fig. 6 indicates that a high degree of pyrexia at this age does not make the pulse wave become dicrotic or hyperdicrotic. In later life dicrotism is usually fully developed in the febrile pulse, but when complicated with aortic stenosis

Fig. 7.—Pulse of an Infant 14 weeks old. (High tension type—secondary waves more developed.)

or aortic aneurysm the alterations in the pulse tracings are not nearly so pronounced.

Until the end of the first year of life the infant's pulse remains of this high tension type, but after a few months the secondary waves become more distinct, and the volume of the pulse has increased, as is evident in the tracing, Fig. 7, from a child fourteen weeks old.

The chief points that I have endeavoured to establish in this communication are:—(1) That, notwithstanding the statements of Ozanam and Keating and Edwards, the sphygmogram of the new-born infant's pulse is not the simple type of curve which they describe; (2) that it shows a distinct percussion wave which forms a pointed summit to the curve, and that the usual secondary waves are quite recognisable, therefore the sphygmogram is *not* of the monocrotic type; (3) that it reveals all the characters of a *relatively* high tension pulse; (4) that in very young infants the form of pulse tracing is comparable to that obtained in aortic stenosis and aortic aneurysm in the adult, where the characters of a high tension pulse are also produced; (5) that dicrotism is as fully represented at birth as it is in any high tension pulse;[1] (6) that the summit of the pulse curves becomes more pointed, and the secondary waves are accentuated during the first year of life, but the pulse still remains of moderately high tension; and (7) that pyrexia in children under a year old very rarely produces dicrotism or hyperdicrotism of the pulse.

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DISEASE OF THE NAILS RECURRING WITH EACH PREGNANCY

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A BRIEF note of the above case is put on record, as it furnishes a well-marked example of a definite form of nail disease, and has also an added interest from its repeated and apparently rare association with the periods of gestation.

Mrs T., aged twenty-eight, married for nine years, and with

[1] I have recently obtained a tracing from the posterior tibial artery of a foetus, during the process of "turning," where the position of the dicrotic notch is clearly indicated.

PLATE VI.—TO ILLUSTRATE DR FOGGIE'S CASE OF DISEASE OF THE NAILS RECURRING WITH EACH PREGNANCY.

Photograph of water-colour drawing of nails of Mrs T. in October 1899, showing, in the case of the thumb and fourth finger, the free nail with its changed colour, and in the other fingers the broken, irregular nails with the exposed nail beds. Several show some lacerations of the nail folds as well.

five of a family, came under observation on 9th August 1899 on account of an affection of her nails. She had always been a healthy woman, but had had some form of eczematous disease about her back ten years ago. The eldest child has just been under treatment for eczema of the face.

The nail affection has been present with every pregnancy except the first. It began on this, as on previous occasions, about the fifth month of gestation with a sudden, aching, hot and painful feeling at the ends of the fingers and thumbs. Before long the nails began to separate at their free margins and their sides, and to be raised up from their beds by a scaly accumulation. The raised portions of the nails soon showed nutritive changes. Longitudinal ridges and flutings developed along their now greyish, lustreless surfaces, and where the loosening process had gone further the nails were quite slack, and could be rocked in their beds. Within a month or two the condition was so aggravated that almost the whole of each nail had become separated from its bed. By October (see photograph) these brittle nails had mostly got broken off, and the nail beds were completely exposed except for the small margin of healthy nail beginning to emerge from the nail fold. Some of the growing nails showed considerable transverse irregularities, although in other respects they were normal. There was redness of the skin at the base of the nails, and in parts the nail folds were lacerated. By the beginning of 1900 the nails had almost resumed their natural appearance.

In April 1900, the patient, again pregnant, and in the fifth month of her gestation, returned with the same hot, painful feeling under her nails, which bitter experience had led her to interpret as the prelude to each long drawn out attack. By May the affection was already developing in a manner precisely similar to the last observed attack.

These two attacks appear to have been identical with the three preceding, except that during these two later ones there have been present for the first time distinct patches of psoriasis on the left elbow, the right knee, and the back of the left hand. The patient states that with this recurring disease the palmar surfaces of the hands incline to become horny.

The treatment adopted in the first attack observed con-

sisted in the local use of tar ointment, and later of resorcin in rectified spirit, along with the internal administration of arsenic and strychnine. In the second attack arsenic alone has been prescribed, but has had to be discontinued on account of gastric irritation.

Remarks. — The diagnosis of affections of the nails is generally held to be somewhat uncertain unless there are present in other parts of the body definite skin lesions, which give a clue to the nail condition. Lately, however, Hutchinson, in his *Archives of Surgery*, vol. x., 1899, has striven to show that some at least of these nail lesions can be perfectly well recognised even when they occur independently, and that the previous, simultaneous, or subsequent occurrence of characteristic skin lesions is not necessary for a diagnosis, but, of course, strengthens the same. Of such a distinct type is the nail lesion produced by psoriasis or by eczema. Psoriasis of the nails shows itself as an affection of the nail bed, which leads to a loosening of the nail from its bed, to an accumulation of scales under the nail and to subsequent nutritive changes, which may culminate in its exfoliation either in whole or in part. "In eczema," says Hutchinson (*loc. cit.* p. 194), "the surface of the nail rather than the nail bed suffers, and the evidences of disease are usually first seen near the root and not at its free edges." The above case would thus furnish a fairly pure example of psoriasis of the nail bed, although one or two points in the clinical features have more of an eczematous nature about them.

The association of various skin diseases, more especially of an eczematous or of a herpetic type, with pregnancy has been frequently noted, but there is apparently no particular mention of psoriasis, and least of all in a form limited to the nails.

CASE OF LAMINECTOMY FOR PARALYSIS DUE TO PRESSURE ON NERVE ROOTS

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and
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THE earlier history of the patient, who is an upholsterer, aged 28, was published by Dr Bruce in the form of a clinical lecture in the February number of the *Edinburgh Medical and Surgical Journal* of 1900. "A case of traumatism of part of the cauda equina, complicated by alcoholic neuritis." It was briefly as follows:—A fall downstairs followed by complete paralysis of the left lower extremity with an area of anæsthesia corresponding to the distribution of the twelfth thoracic or dorsal, the five lumbar and the first sacral nerves. To this condition there was superadded later, paralysis of the right leg and foot, hyperæsthesia to pressure upon the muscles of the right lower extremity, and of the muscles underlying the still æsthetic areas of the skin of the left lower limb.

Reasons were given for the view that the paralysis was due to some form of pressure by the lamina of the twelfth dorsal vertebra, as that was the only structure which could affect *all* these roots without any further symptoms. The patient was sent to the North of Scotland to his home, with instructions to remain a total abstainer from alcohol and to return for operation so soon as he had recovered power in the right foot. This he accordingly did in the month of July 1900, and after a short stay in the medical ward under Dr Bruce, he was transferred to Professor Annandale's care.

Professor Annandale reports as follows:—"In July last my colleague Dr Bruce consulted me in regard to this patient. He told me that the man had received a direct injury to his spine, and from a study of his symptoms he was of opinion that there was some pressure or irritation upon the spinal roots at a point corresponding to the twelfth dorsal vertebra.

Having by examination confirmed Dr Bruce's diagnosis, he and I agreed that an exploration of this region was advisable. Accordingly on the 15th July, the patient having been chloroformed, I explored the transverse processes and laminæ of the tenth, eleventh, and twelfth dorsal, and first and second lumbar vertebræ, by turning up a flap of the soft textures from left to right. When the bones were exposed nothing abnormal was noticed, but when the spinous processes and laminæ of the twelfth dorsal and first and second lumbar vertebræ were removed, and the spinal canal thus freely exposed, there was seen to be a marked contraction of the spinal cord at a point corresponding to the twelfth vertebra, this contraction being due to a distinct narrowing of the spinal canal. This narrowing of the canal and contraction of the cord was limited to an extent of about half an inch. No other abnormal condition of the cord or its membranes could be detected. The wound having been closed by sutures, superficial and deep, a drain of iodoform gauze was inserted. His progress after the operation was in every way satisfactory, and on the day following the operation it was noted that the motor power and sensibility of the left foot had already improved. This improvement slowly continued, the wound healed well, and he was transferred to Dr Bruce's medical ward upon 1st September."

The patient remained in the medical house and in the Convalescent Hospital under the care, successively, of Dr Bruce and Professor Fraser. During that time there was a steady, if slow, improvement of motor power in the lower limb, but only a very slight diminution of the anæsthesia.

The slow improvement of the lower extremity was accounted for by the fact that the muscles had undergone atrophy to a large extent during the long time which elapsed between the original injury in February 1899 and the operation in July 1900. This atrophy was indicated by the completeness of the reaction of degeneration present in all the muscles. The recovery was most complete and earliest in the muscles of the hip, least complete in the foot. It is not necessary to enter into the details of the progress of the case. At the time of his leaving the hospital the resident physician, Dr Arthur Preston, reported that at the hip-joint the limb could be abducted, adducted,

crossed over the other limb, advanced and retracted almost to the normal amount, and rotated outwards and inwards to a more limited extent. He could bend the knee only very slightly, even when lying in bed. The patient could not dorsiflex the ankle, but if it is passively dorsiflexed he could extend it again. He could flex all the toes except the great toe. He required crutches in walking, swinging his right leg forward from the hip-joint. He was able to bear a considerable amount of his weight on the right leg. The anæsthesia had diminished to a very slight extent, practically only over the area corresponding to the supply of the first sacral root.

Since leaving the hospital the patient has written to the effect that the strength of the limb has considerably increased, but that the movements of the foot and ankle are still imperfect.

In considering the causes of the slow return of motor power and imperfect recovery from the anæsthesia, it has to be remembered that the long continued pressure on the nerve roots had led to a degeneration of the nerves and of the muscles of the lower limb, and that recovery of motor power had to be preceded by a regeneration of both nerve and muscle fibres. The fact that the recovery of motor power was greater in extent than that of sensation is probably to be attributed to the circumstance that the pressure of the affected lamina must have been exerted to a greater extent on the posterior than on the anterior roots, and had caused damage of a permanent nature to these roots. The cause of pressure was evidently due to a thickening of the lamina from chronic periosteal irritation, whether the result or not of a fracture it was not possible to determine definitely. The examination of the lamina gave no indication of any such injury.

Special Article

THE SAFE ADMINISTRATION OF CHLOROFORM AND COLONEL LAWRIE'S BOOK[1]

By THOMAS D. LUKE, M.B.,
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IN a beautifully printed and well illustrated volume of 120 pp., Surgeon-Colonel Lawrie has given to the profession his last word on Chloroform Administration—in fact, as he says in the oft quoted words of Syme, "how to do good without the risk of evil."

The pronouncements of one so well versed in the art of producing chloroform anæsthesia must be looked upon with all due respect. His anæsthetic record given on page 111 is one which few men can equal and most will envy. He is both to be congratulated on his immunity from fatalities—with one exception — and a singular freedom from all necessity for restorative measures, and consequent freedom from anxiety.

Before discussing any of the suggestions and things recommended by Colonel Lawrie, I think it would be well to discuss this question of statistics—and how easily in the study of anæsthesia they may be prepared, often quite unwittingly, so as to give a false impression and lead to utterly wrong conclusions.

There are three very striking points which it is most essential to keep before us while considering Colonel Lawrie's results.

First.—That all his experience has been obtained in a tropical climate, and his patients are practically invariably natives.

Second.—He lays such enormous stress on the danger during the induction of anæsthesia and the struggling stage, and so entirely ignores any possibility of death or trouble occurring later, that one is driven to the conclusion that Colonel Lawrie must attribute deaths occurring late or in any anæsthesia as due to the tax of the operation on the patient's powers, *i.e.* practically to "shock"—"shock and chloroform are incompatible"

[1] "Chloroform: A Manual for Students and Practitioners." By Lieut.-Col. E. Lawrie, M.D., I.M.S., Principal of the Hyderabad Medical School. London: J. & A. Churchill. 1901.

—*ergo*, any shock and results from it must be due to other causes than the chloroform.

Third. — Colonel Lawrie uses chloroform with such frequence, and for such trivial operations—that his average duration of anæsthesia is extremely short, and consequently his operations are hardly comparable to those for which chloroform is administered in a large general hospital.

Thus of the seven operations of which details are given in his book, one, including induction of anæsthesia, lasted 56 seconds! The average time, also inclusive, was 8·64 minutes.[1] Of 1521 cases recorded in 1891-92, the average time was 11·9 minutes. In such brief anæsthesias it is quite obvious that the possibility of "evil result" is much diminished.

In most Indian hospitals a large number of operations are of a comparatively trifling nature. Lithotomy and lithotrity form a suprisingly large proportion, and are thought little more of than a tooth extraction in our own country.

The shattered remnants of humanity such as are picked up in the crowded streets in our large towns—and after railway smashes—and carried to our hospital theatres to be pruned and patched up by the surgeon, are comparatively rare in India. In operations on such cases as these it is that our anæsthetic mortality is run up.

In regard to point 1, viz., that Colonel Lawrie's patients are chiefly natives, this has an important bearing on the question. Natives of India are almost universally abstainers from strong drink; smoking to excess is not one of their weaknesses. They are vegetable feeders, living mainly on rice, and from this and from the free action of their sudoriferous glands, gout and uric-acidæmia do not exist to impair their cardio-vascular systems.

The bulk of the natives are Mahomedans or Hindus and fatalists. Whatever the Supreme Being decrees to them in life or death they are prepared to accept with resignation, and are singularly unconcerned as to the future. A patient will be much more concerned about temporary ailments than any possible ill effects of a suggested remedy. He is a man of superstition, and has much faith in the healing powers of the doctor-Sahib—a faith in professors of the healing art

[1] Report of B.M.A. Anæsthetic Committee, Appendix 2. 1900.

which has always been marked in Orientals. What has been termed "nervousness," "nerve tension," among twentieth century Europeans has not to be reckoned with. It has been remarked[1] that soldiers, especially when campaigning, bear anæsthetics unusually well. They are engaged in the game of war, and are too callous in matters of life and death to be upset in any way by the risk of an anæsthetic.

All men of experience will regard Colonel Lawrie's results as almost unique and worth envying, but the fact remains that the average mortality under chloroform works out something like 1 in 3000. A surgeon who is widely known, and an advocate of chloroform as a routine anæsthetic, recently told me with some pride that out of 3000 to 3500 administrations he had *only* three deaths! And I have in my possession the records of a large general hospital showing a mortality of 1 in 250 for chloroform.

I propose to deal with Colonel Lawrie's methods, axioms, and recommendations *seriatim*.

First, his *modus operandi*. He recommends the use of a cloth cone, with a piece of absorbent wool stitched in the apex —what appears from the fig. on page 50 to somewhat resemble a "sweetie bag"—a paper "fool's cap." We are told that the cap should be fairly closely applied, and there is a suggestion of something bordering on a "close" method. Children are to be treated more vigorously, and we are to hold the inhaler "close down" — jam it down, in fact! One drachm of chloroform is to be added every forty-five to sixty seconds, and the inhaler re-applied. Now it appears to me to be quite immaterial how an anæsthesia is produced with chloroform, whether we use the "apparatus" Colonel Lawrie has adopted, a piece of lint, or a discarded mitten as the vehicle. There is always an objection attached to any cone or inhaler of sponge or felt which is used repeatedly, in that it gets soiled. It may readily become blood-stained, and male patients sometimes take to expectoration in the early stages of chloroform anæsthesia, which will render the inhaler unfit for further use; also it will during a long operation become impregnated with stale, half-decomposed chloroform, making it exceedingly un-

[1] Professor Chiene, "Surgical Experiences in South Africa." In Crimean War, mortality only 1 in 10,000; in War of Secession, 1 in 11,448.

pleasant for the chloroformist. Hence the advantage of a piece of lint or towel. It is a matter of expediency and of individual taste; of course one would prefer something approaching asepticity — and it is undesirable to blister the patient's face by direct contact with chloroform. But after all the problem is—given a patient to anæsthetise—to get him under as quickly as may be done safely, and as pleasantly to himself as possible. It is useless to recommend routine use of a drachm every sixty seconds. Some patients will require considerably more—most less—and with both it will entirely depend on the amount of air allowed.

"As a general rule unconsciousness supervenes" after second or third drachm, "and in this stage many of the minor operations of surgery can be performed"—*with safety* is omitted, but this is implied. We are to understand that the patient may be subjected to operative treatment during light anæsthesia. It is notorious that a very large proportion of fatalities have occurred during this stage—while patients are being subjected to such procedure as breaking down adhesions, reducing dislocations, evulsing toe-nails, cutting the external rectus oculi, cutting the spermatic cord, and dilating sphincter ani. Death in such instances is due to shock, or vagus inhibition; but then "shock is incompatible with chloroform" —and has not Colonel Lawrie proved vagus inhibition to be "little better than an idle dream"?

"The tests of anæsthesia—(1) snoring; (2) quiescence and relaxation of muscles; (3) abolition of corneal reflex." Now snoring is certainly not constantly present—and why is no attention drawn to the pupil? Though by no means invariable, when the patient is fully anæsthetised the pupil is tightly contracted. Colonel Lawrie appears to regard this as so unimportant as to be unworthy of mention.

"Two or three assistants should always be present"—and in a letter to the British Medical Association Anæsthetic Committee, dated 5th January 1893, Colonel Lawrie goes even further, and says, "Chloroform should never be administered unless four or five trained assistants be present."

Now, the great point in favour of chloroform always has been its convenience, and the ease with which it can be used by the general practitioner single-handed. If its warmest advocate

thus handicaps its employment, he unwittingly produces one of the strongest arguments for the general adoption of ether we have seen, for the country practitioner can as little be expected to lay his hand, in an emergency, on "four or five trained assistants" as on "the skilled anæsthetist."

We are told that "if a meal has recently been taken, the tendency to cause indigestion and vomiting should not deter the surgeon from giving chloroform." Has the possibility of food becoming impacted in the larynx not occurred to Colonel Lawrie? We imagine that few people would take exception to the trifling inconvenience caused by indigestion; but were the urgency such as to render the use of an anæsthetic desirable "after food," it is surely a simple matter to empty the stomach by siphonage and so prevent any embarrassing results.

"In dentistry the anæsthesia of chloroform, whether partial or complete, is infinitely superior to gas anæsthesia." "The benefits of anæsthesia would be immensely extended if all dentists were taught to give chloroform by the Hyderabad methods."

It is difficult to realise how any man, not absolutely blinded by prejudice, or entirely ignorant of nitrous oxide anæsthesia, can make such a statement. We will for the moment suppose that chloroform is given *secundum artem—à la Hyderabad*, and given as skilfully as by Colonel Lawrie, and that consequently the mortality is 1 in 17,000. What do we find in regard to the frequency of fatalities under nitrous oxide?[1] Mr Bellamy Gardner says (1901), "The fact remains that by diligent search I can only find accounts of eighteen deaths in Europe and America in connection with its administration. I think that in thirty years of widespread daily administration the total number of administrations must have amounted to several millions.

"Even amongst recorded fatalities only half can in any strict sense be put down to nitrous oxide itself." Details in regard to nitrous oxide were also given by H. C. Wood in an address to the International Medical Congress in Berlin in 1890 as follows:—"That on enquiry from reliable sources he had found that anæsthesia by nitrous oxide is probably effected

[1] "Accidental Factor in Anæsthesia," published London: Baillière, Tindall & Cox, 1901.

in three-fourths of a million cases annually in the United States of America, not by trained physicians, but often by comparatively untrained persons and ignorant dentists, in the sitting or semi-sitting posture, without thought or care to the general community, as the units represent the healthy and diseased alike, and the result is, out of many millions of inhalations only *three deaths* are recorded as due to nitrous oxide in the United States of America. Could anything be safer?"

Now, the question remains, what does Colonel Lawrie mean by "superior" physicians generally look with favour on a drug which accomplishes the purpose for which it is administered, *tuto cito jucunde.* Now, I think it has been proved that nitrous oxide gas is safe. To the uninitiated I say, "Go and see it administered and see anæsthesia produced in thirty seconds by a stop watch, and then undergo an administration yourself and find oblivion in ten seconds. Can chloroform do this?"

The underwritten is the paragraph recently obtained from a newspaper; it is a typical result of the use of chloroform for dental extractions, and is one instance among many:—

"Death under Chloroform.—J—— W——, a young man of ——, died suddenly yesterday afternoon under distressing circumstances. He was put under chloroform by his medical attendant preparatory to a dentist extracting several of his teeth. Two of the teeth had been removed when he collapsed, and though artificial respiration and other efforts were made to restore animation, he never rallied. Death was attributed to failure of the heart's action. Deceased was only about twenty-one years of age."

This man undoubtedly died during light anæsthesia of cardiac syncope—"fear syncope"—vagus inhibition—whatever you like to call it; such deaths have been almost weekly occurrences since 1847. Hundreds of people have died so, and hundreds more will die unless another anæsthetic than chloroform is universally adopted for dental work.

In these cases the question of mal-administration hardly comes in. The erect or sitting position is now universally abandoned. The patient is got "under," and the extraction proceeded with, but if it is prolonged the anæsthesia has become light before the extractions are done, and when the

patient is bleeding freely into his mouth the anæsthetist naturally shrinks from deepening the anæsthesia by re-applying the chloroform. The patient is thus left between two stools, and suffers accordingly. This points most emphatically to chloroform being absolutely unsuitable for dental work. Were the dental surgeons to follow Colonel Lawrie's advice, and learn to give chloroform by the Hyderabad or by any other method—which God forbid—the anæsthetic death-roll would immediately become immensely heavier than it already is. We can picture the state of unease and wretchedness into which society would be plunged were it to become daily routine for dentists to carry out the most trifling extractions under chloroform. Fortunately these gentlemen are fully alive to the risk of chloroform;[1] their distrust in its use is growing, and is best shown by the fact that they invariably call in a medical man who undertakes the full responsibility to administer it. For any anæsthetic work they do for themselves, nitrous oxide alone, or followed by ether, is invariably used. In London no respectable dentist will have chloroform given in his house.

With reference to the overwhelming importance which Colonel Lawrie attributes to the removal of the chloroform during the struggling stage—thus leaving his readers to believe that if a death do occur it must almost invariably occur then, for no mention of death happening otherwise is made by him—it is well to point out that Hewitt has investigated the stage and condition of anæsthesia at which death occurred in 210 cases, as follows:—

I. *Time.*

Under 1 Minute	10
1 to 3 „	13
3 „ 5 „	12
6 „ 15 „	33
Over 15 „	7
Unstated	135
	210

[1] See leading article "On Chloroform and Dentistry," *British Journal of Dental Science*, Feb. 15, 1901.

II. *Stage of Anæsthesia when Death occurred.*

1. Commencing to inhale	14
2. Stage of excitement	30
3. Incomplete anæsthesia	49
4. Fully under influence	68
5. After operation	31
6. Unstated	18
	210

2, 3 and 4 go far to prove that Colonel Lawrie's views are in two particulars at any rate to a great extent fallacious.

"The exhibition of morphine hypodermically in adults in doses from ¼ to ½ gr. should be the rule in practice after the first drachm of chloroform has been inhaled." And we are told that the advantage of this is that "the anæsthetic action of the drug is not increased," while "sleep and rest are produced after."

In recommending such a procedure for general adoption, Colonel Lawrie is at variance with the views of everyone with experience or practical acquaintance with the subject. Demarquay, Régnier, Hewitt, Buxton and Horsley all condemn the employment of morphia with chloroform as increasing the risks of the narcotic. Horsley finds it "increases the danger of respiratory paralysis"; Poncet, a military surgeon, who used the combination largely in the Franco-Prussian War, abandoned the practice as "causing prolonged stupor (Colonel Lawrie's rest!) and dangerous depression of the body temperature." In connection with this point we must again bear in mind that Colonel Lawrie's work lies among a people who to a large extent use opium habitually. The maximum British Pharmacœpia dose of morphia is ½ gr. It is a drug which is borne very badly by some people, and it is impossible to tell off-hand if any particular individual would tolerate a large or even small dose. Its toxic action is to cause slowing of the pulse and respirations, and finally death by asphyxia.

In view of these facts, the undesirableness of its use and the temerity of anyone generally employing it appears to be obvious. In certain operations on the brain and meninges it

may be worth while to run the additional risk, as the surgeon is materially assisted by lessened cerebral circulation, but great care must be taken that no respiratory embarrassment or kidney disease is present, and much less chloroform should be given. It requires no great stretch of the imagination to believe that doses of chloroform every sixty seconds preceded by ½ gr. morphia given by the average administrator would in a large majority of cases produce alarming results.

"Chloroform and shock are incompatibles." "Chloroform has no power to increase the tendency to shock in surgical operations."

This—in a manual for students!

Now, shock is a condition characterised by slow, feeble, irregular cardiac pulsation and greatly lowered blood pressure. Colonel Lawrie admits that the primary action of chloroform is to lower the mean blood pressure, and, indeed, diagramatically illustrates this on page 22; and it is a matter of common knowledge that in the condition of shock the administration of any anæsthetic is fraught with the greatest danger of causing complete arrest of the cardiac pulsations and respirations.

Looking at it from another point of view, let us suppose that an operation is being done on a patient not already suffering from shock, *e.g.* something like an intestinal anastomoses, and that the operation is expended over two or three hours. Can Colonel Lawrie honestly say that under such circumstances he has not seen the patient show signs of complete collapse, or deny that a large portion of the symptoms of collapse are due to cardiac asthenia and associated depression produced by the prolonged toxic action of chloroform—quite apart from the effect of any operative procedure?

On page 20 Colonel Lawrie quotes Dr Lauder Brunton as follows:—"The fear of chloroform paralysing the heart is based on laboratory experiments rather than on clinical experience."

Now, this reads very funnily, for the report of the Hyderabad Commission was based almost entirely on laboratory experiments—experiments carried out with a view to proving that chloroform had no paralytic effect on the heart. They

were entirely under the direction of Dr Brunton, Colonel Lawrie tells us, while he himself merely drew deductions. Now, the curious thing is that apparently Dr Lauder Brunton was not quite so completely convinced as Colonel Lawrie himself, for on page 11 we read: "Dr Lauder Brunton proceeded to England to convert Europe and America, *but he could not entirely divest himself of the opinion he had held and taught for so many years, that 'one of the dangers of chloroform is death from the stoppage of the heart,'* and the conversion of Europe and America largely devolved on me." It is a subject for great congratulation that in the conversion Colonel Lawrie has not met with great success. It is a notorious fact that in most parts of America ether is used almost exclusively, and that the employment of chloroform in general surgery is regarded as almost criminal; while in this country the profession has used ether and other anæsthetics to a much larger extent than before the Hyderabad Commission issued its report.

As regards the everlasting question of the stoppage of respiration and circulation, as Mr Leonard Hill points out,[1] the Hyderabad Commission gave itself away entirely. They came to the conclusion that respiration ceased first, but that the conclusion was based entirely on supposition is evidenced by the statement that in all cases of accidental death the usual chloroformist was absent, and presumably a student or laboratory attendant only being in charge—at any rate, no reliable observer noted exactly what occurred.

The general consensus of opinion, both of physiologists and of practical observers—skilled anæsthetists—is, that in the large majority of cases the heart stops first; in some cases the heart and respiration ceased simultaneously.

In the most hopeless cases of suspended animation—in those arising during the induction of anæsthesia, in the struggling stage—death is almost invariably due to cardiac syncope—the heart stopping in diastole in paralytic dilatation. In syncope occurring during prolonged anæsthesia—a condition which Colonel Lawrie entirely ignores—circulation and respiration grow weaker and weaker, and finally cease simultaneously, the respiration ceasing from anæmia of the spinal

[1] *Brit. Med. Jour.*, April 17, 1897.

bulbe. It is to guard against this condition that pulse observation in the later stages of an anæsthesia is of value; and the practical point is when the respirations are shallow and the pulse almost imperceptible, the lips and ears pale—to stop the chloroform, lower the patient's head, give a hypodermic of $\frac{1}{12}$ gr. strychnine, or infuse ½ to 1 pint of 7 per cent. saline solution, and go on with C.E. or ether alone. If the breathing stops altogether at this stage the success or failure in using artificial respiration depends entirely on the period which elapses between the cessation of natural respiration and the commencement of artificial respiration, and thus largely on the vigilance of the anæsthetist and his noting the condition and pointing it out to the operator.

The syncope arising during light anæsthesia from emotional fear, from vagus inhibition and absolute overdose of chloroform, due to gasping respiration subsequent to struggling, is practically always fatal, and all respirative measures are useless.

Leonard Hill, whose reputation as a physiologist is world-wide, characterises Colonel Lawrie's doctrine of the universal cessation of respiration before the heart stops as one of the most pernicious ever put before the profession. He considers that ignorance of precise physiological methods was betrayed throughout much of the Hyderabad Commission work, and many of the experiments were so carelessly performed that their findings were entirely misleading. In the vagus inhibition experiments, instead of using clip electrodes and isolating the nerve, ordinary hand electrodes of the crudest description were used, and to any one familiar with the relations of the vagus nerve it is obvious how easily wrong conclusions could be arrived at.

Colonel Lawrie's views are entirely in opposition to those held after prolonged search by competent and highly trained physiologists, such as Gaskell, Shore Hill, M'William and Coates on the one hand, while on the clinical side there are arrayed against him men who have spent their life in the study of anæsthesia, such as Woodhouse, Braine, Bailey, Buxton, Hewitt, and many others. With reference to these latter it is instructive to note the change in Colonel Lawrie's expressions:—

Article in *Medical Chronicle*, January 1891.

The practical outcome of the teaching of the Glasgow Committee is that relief of pain by chloroform is to be handed over to the specialists who alone are to administer it, though their declarations and statistics show that they are unable to do so with safety. *There is no more need for an anæsthetist with his inhaler and other apparatus than a hypodermic injectionist or other poisonist.* If the anæsthetist is to be tolerated hereafter at all, it must be because he is a man of pleasant presence and cheerful countenance who knows how to comfort and reassure the patient until chloroform otherwise is secured.

"Chloroform," January 1901.

The elimination of the element of risk in the administration of chloroform will not be without its influence on that learned and powerful body, the Anæsthesia Specialists. The final removal of a direct, sudden and capricious action of chloroform on the heart will vastly improve their position and usefulness, as it will increase the number of cases in which skilled anæsthetists will be called upon to administer it—and the full recognition of its paramount value in dentistry will widely extend their field of practice as well as the advantages which the anæsthetic confers.

Poor humanity, for upwards of half a century, has been subjected to the blundering and futile efforts of these aforementioned anæsthesia specialists to produce safe anæsthesia; endless fatalities have occurred, absolutely due to faulty methods of administration and wrong principles. Colonel Lawrie would have us believe that now, at the dawn of the new century, the anæsthetic millennium has arrived, and chloroform, so long unjustly regarded with something more than suspicion, is found to be harmless as *aqua pura* if "the only way" be taken by the administrator!

There is much that is true and practical in Colonel Lawrie's book, but material of this nature is so fragmentary and so padded around and obscured by opinions and statements which are utterly misleading that the book as a whole is calculated to do much harm. We can imagine a newly diploma-ed medical

man about to enter general practice, or take the part of house-surgeon, procuring a copy of a work emanating from so illustrious a source as the late Chairman of the Hyderabad Commission in order to learn "how it *should* be done." The adoption of the principles laid down could only be followed by speedy disaster to himself and danger to the community at large. It is impossible not to believe that Colonel Lawrie must be a brilliant anæsthetist, that he thoroughly understands his own "principles," and is a past master in the manipulation of his apparatus. He has many "trained assistants" and other things in his favour, and his results appear most excellent. But granting all this, his method cannot be recommended for general adoption.

No one is prepared to state in these days—at least no one who knows anything about the subject—that chloroform is a safe anæsthetic, give it how you will, and few will recommend it for dental and minor surgery.

The fact has to be faced, however, that chloroform must and will be given for many of the operations of surgery as the only means at present known of obtaining satisfactory anæsthesia when the convenience of the operator be taken into account. In a journal published in the native land of Simpson and the home of chloroform, it would argue considerable temerity, and border on presumption, for me to suggest any particular method of administration. There are many, varying from Professor Waller's minim doses or fractions thereof, administered by the displacement of air contained in a graduated series of rubber balls, with a Krohnes inhaler to the unmeasured quantity of chloroform recklessly poured on a towel from the bottle "regardless of expense." There is a happy medium, of course. There always appears to be a strong objection to placing an indefinite quantity of chloroform within the patient's reach, from which by a few extra deep inspirations an overdose is readily taken. If the administrator be an acute and a trained observer it will not occur, but to the tyro such a method is fraught with danger; it takes little to distract his attention from the anæsthetic—a sudden spurting of a large artery, the exhibition of a calculus, or any such interesting development, would divest his mind from the [illegible] and the patient's doom is sealed.

It seems desirable, therefore, especially for the inexperienced chloroformist to keep down the quantity of chloroform received to as small an amount as is practicable—say 20 ms. to 30 ms. —and renew frequently ; and thus the patient will have plenty of air, and the administrator must of necessity keep up continuous observation. There is nothing more dangerous than "see-saw" anæsthesia—one moment the patient is breathing stertorously, in a condition bordering on absolute chloroform poisoning, and a few minutes later flinging about his legs, and nearly rolling off the table. No text-book [1] of surgery is considered complete in these days without some chapter dealing particularly with anæsthesia and chloroform.

Mr Jacobson prefaces his work on operative surgery with a series of anæsthetic aphorisms which are well worth quoting, in conclusion—

1. There is as yet no perfect anæsthetic.
2. There is no absolutely safe anæsthetic.

It is not likely that any drug which is powerful enough to bring a patient into a condition in which on the brink of the grave will be absolutely safe, especially when the visceral and mental conditions of our patients are remembered. It may be permissible with very nervous patients to talk of "putting a patient to sleep," but there is no real comparison between surgical anæsthesia and sleep. In sleep a comparatively slight stimulus will raise the patient, but in perfect surgical anæsthesia "nothing remains of life but the organic functions, the nerve centres are paralysed down to the parts presiding over respiration and circulation. Life hangs in a tremendous balance. No hands can be too skilled to hold the scales."

3. Deaths from anæsthetics are most frequent in operations for trivial cases, when the administrator is liable to be off his guard, and the friends are certainly least prepared.

4. So-called deaths from anæsthetics really fall into certain groups. (*a*) Deaths due to the anæsthetic which has been carefully administered. (*b*) Deaths due to the anæsthetic which has been carelessly, often hurriedly administered. (*c*) Deaths due not so much to the anæsthetic as to some disease

[1] A particularly excellent chapter on the use of chloroform, ether, etc., is seen in Gould & Warren's International Text-Book of Surgery: W. B. Saunders & Co., London & Philadelphia, 1901.

present in the patient, or much more rarely, to his mental condition.

5. Two golden rules should be remembered during every administration:—(1) While enough of the anæsthetic should be given to ensure complete insensibility before the surgeon commences, and while he is operating; (2) care should be taken that the patient has no more of the anæsthetic than is absolutely needed. While neglect of the first rule causes great inconvenience and waste of time, neglect of the second is sometimes responsible for loss of life, and more often for the prolonged vomiting and malaise which often interfere with the after-treatment.

Recent Literature

CRITICAL SUMMARIES AND ABSTRACTS

MEDICINE

THE CIRRHOSES OF THE LIVER

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THE cirrhoses of the liver are commonly grouped in three classes, namely, *first*, Laennec's atrophic cirrhosis—the common cirrhosis producing the hob-nail liver; *second*, Hanot's hypertrophic or biliary cirrhosis; and, *third*, syphilitic cirrhosis. These have synonyms based upon the leading histological change they present; thus the first is polylobular cirrhosis, in virtue of the fibrous tissue surrounding several lobules; the second is monolobular or biliary cirrhosis, as the fibrous tissue surrounds individual lobules and there is a seeming increase of bile ducts in the portal spaces; the third is pericellular or intralobular, because the fibrous tissue appears simultaneously throughout individual lobules and thus surrounds groups of liver cells.

On the clinical side it is commonly taught that these have the following distinctive features:—*Atrophic cirrhosis* shows diminution in the size of the organ as judged by percussion; a hard nodular edge or surface when within reach of the palpating hand; ascites, emaciation, and no or but slight jaundice, and this present only in the advanced stage. *Hypertrophic cirrhosis* is characterised by enlargement of the organ as revealed by percussion; a smooth surface and edge revealed by palpation;

no ascites, marked jaundice. *Syphilitic cirrhosis* may present the clinical features of either of the preceding; the liver may have a lobulated surface from the development of fibrous strands in it, and perihepatitis is common.

From the etiological standpoint the atrophic form is usually attributed to the imbibition of alcohol which reaches the liver, and acts through the portal blood upon the fibrous tissue of the portal spaces; the hypertrophic is referred to influences acting from the bile ducts upon the surrounding fibrous tissue, while the involvement of the bile ducts is the cause of the jaundice which is so prominent a feature in this form.

Clinical and anatomical difficulties which have arisen in connection with cirrhosis are to be attributed to the classical descriptions given of the atrophic and hypertrophic forms respectively. Speaking of Hanot's description of hypertrophic cirrhosis, Cheadle says (Lumleian Lectures, 1900, *On Some Cirrhoses of the Liver*): "It is surprising how a definite observation of this kind, stated with authority, holds sway, and its general application remains unquestioned, as all-comprehensive, without further examination or inquiry." This comment can with equal force be applied to other conditions and descriptions, and there is no doubt that the first definitions of diseased processes may greatly hamper the acceptance of later and more complete observations and the inferences which follow from them. Names become associated with definite clinical manifestations, and proposed rearrangements are slowly accepted. Applying this to the matter at present under consideration, it appears to me that the difficulties which have arisen centre round the term "hypertrophic" given by Hanot. The word is used to designate an enlarged liver, in contradistinction to the "atrophic" or small liver of Laennec. The two types of cirrhosis thus defined became fixed; but, as experience has widened and investigations have multiplied, it has become increasingly apparent that the terms atrophic and hypertrophic do not necessarily carry with them either the clinical manifestations or the histological characters which authority associated with them. This divergence from the type as originally fixed is most marked in the enlarged or "hypertrophic" form. A liver may be enlarged, and therefore clinically, although strictly speaking inaccurately, be termed "hypertrophic," and this hypertrophic form may not show jaundice, may be coarsely nodulated, may have ascites, may not show an increase of bile canaliculi, and the fibrous tissue may have a polylobular distribution. This perturbs the equilibrium of both the clinician and pathologist, and it does so because it is authoritatively taught that an enlarged cirrhotic liver ought not to be a coarse polylobular

cirrhosis and ought to cause jaundice. Again, a liver is met with which is small and atrophic, but the fibrous tissue may be diffusely increased and mainly monolobular in distribution, so that it is a finely granular instead of a coarsely granular organ, and there may be a marked richness of bile canaliculi in the fibrous tissue, yet there is no jaundice, and there is ascites. Here, then, is an atrophic liver with the minute structure of a hypertrophic one, and the confusion seems to become hopeless.

It has been shown by the published observations of various inquirers that a hypertrophic liver may exist without the clinical phenomena or the histological characters associated with it in Hanot's classical description. Murchison, Saundby, Foxwell and Cheadle have all shown this to be the case, and others have reached a similar conclusion. In fact, the evidence is so strong that the matter is no longer open to question. But while this change of view has become necessary, it is to be noted that the change attaches itself to the question of size as expressed in the term "hypertrophic." The standpoint of mere size is often a very unreliable one in medicine, and, as we have pointed out, it is so when hepatic cirrhoses are considered. If, however, the standpoint be altered, the whole question assumes a different aspect. If instead of size being the standard the existence of marked jaundice be taken, we arrive at a distinction which is more important and has a more sound etiological significance. The cirrhoses without jaundice are those which are commonly, and probably correctly, referred to blood changes in the portal circulation, but the resulting cirrhosis may lead to a large or a small liver, to a coarse or a finely granular surface, to fibrous tissue rich or poor, in bile canaliculi. On the other hand, cirrhosis associated with marked jaundice is a true *biliary* cirrhosis; that is to say, it has its starting-point, not in blood changes in the portal circulation, but in conditions in the excretory ducts of the liver in some part of their course. These changes interfere with the removal of bile, not with its formation: to produce jaundice in cirrhosis, bile has to be formed and then absorbed into the circulation as such. Here then it seems to me is a crucial and essential distinction both from a clinical and a pathological standpoint. A saving clause has to be added here, as in so many other conditions where boundaries are laid down, and the reservation in cirrhosis is that the common cirrhosis may interfere with bile ducts so as to cause a measure of jaundice, but this is a secondary complication and not the initial change. Cheadle says that of fifty-three fatal cases of cirrhosis of all kinds at St Mary's, marked jaundice was only noted in eight, and in only four of these was the liver small, while in four it was large (*loc. cit.* p. 17).

The proposition that the confusion regarding cirrhosis is removed by abandoning the ordinary clinical concept based upon size, and substituting for it another factor, namely jaundice, requires some further consideration.

Hanot and Charcot both recognised a large liver with jaundice, the cause of which was obscure. In this large liver the cirrhosis was monolobular, and there were many bile ducts in the fibrous tissue. Charcot and Gombault further recognised a cirrhosis with jaundice due to obstruction to the outflow of bile and with the macroscopic and microscopic characters of Hanot's hypertrophic biliary form. Numerous experimental investigations have been undertaken with a view to determine the effect of occlusion by ligature of the main bile duct. Wickham Legg (*St Bartholomew's Hospital Reports*, vol. ix., 1873) in this country, Charcot in France (*Arch. de Physiologie*, 1876), Maffucci of Naples in 1882, and more recently Vaughan Harley (*Brit. Med. Jour.* 1898, vol. ii.), have all done so, and the result has been to show that occlusion leads to enlargement of the liver, jaundice, and a cirrhosis which is monolobular in distribution and more or less rich in bile canaliculi. Nicoti and Richard (*Arch. de Physiologie*, 1880) have described an analogous condition in the liver of dogs due to parasites obstructing the hepatic ducts.

From the clinical side Wickham Legg (*Trans. Path. Soc. Lond.* 1874), Charcot and others have shown that obstruction to the bile outflow in man leads to corresponding liver changes. The former has also shown that in congenital imperviousness of the common duct a like result is produced. Ford of Montreal has recently (*American Jour. Med. Sciences*, January 1901) written an excellent résumé on *Obstructive Biliary Cirrhosis*, in which he records the results of a detailed examination of three cases which occurred in that city, and in which he confirms the observations made by the authors already referred to. One of the points upon which he dwells is that the so-called increase of bile ducts in the fibrous tissue is not of that nature, but that the appearances which have been so interpreted are caused by the fibrous tissue surrounding groups and rows of cells which become altered in appearance and thus give a false resemblance to bile ducts. He on this point agrees with Findlay (*Brit. Med. Jour.* 1900, vol. i.) and others. Ford's observations entirely agree with my own, and I fully concur with him as to the mode of formation of many of the so-called bile ducts. It may, however, be that the appearance is in part due to the persistence of rows of cells which contain a bile ductule, while the cells not containing a ductule perish by compression. This is practically what Cheadle refers to as the "exposure of existing ones

(ductules) by denudation through the destruction of hepatic cells" (*loc. cit.* p. 8). The theory of proliferation of bile ducts as a compensatory process to obstruction has always seemed to me to be quite unreasonable, and as having no analogy in any other organ. Whatever view be held, it is, however, certain that the appearance in question is not confined to cases in which there is obstruction to bile outflow.

From the foregoing it must be accepted that the changes which result from obstruction to the outflow of bile are, as Ford, and others before him, have pointed out, similar and indistinguishable from those described in Hanot's hypertrophic biliary cirrhosis. Cheadle, strangely enough, says "that in the majority of cases of obstructive jaundice, even when prolonged, no cirrhosis follows" (*loc. cit.* p. 34). My own experience is in opposition to Cheadle and in accord with Ford.

This point being established, the question is suggested: Is Hanot's hypertrophic biliary cirrhosis a clinical and pathological entity apart from obstructive biliary cirrhosis? It is difficult to arrive at a perfectly satisfactory answer to this question. Cheadle and others consider that it must be a very exceptional condition, judging from their own experience. This, I think, will be found to be the common experience in Britain. The idea is that the true Hanot's cirrhosis is a primary and probably infective inflammation of the bile ducts. The acceptance of this view allows the changes in the liver to be interpreted as due to obstruction, but indicates primary duct inflammation as the cause of the obstruction. This, again, raises the question as to the determining cause of the duct inflammation. There is evidence to show that the passage of a calculus, which has escaped into the duodenum, may leave behind an infective inflammation of the ducts which can cause a catarrhal block of them owing to the low pressure at which the bile flows. I have seen a case where the draining of an inflamed gall-bladder, where no stone was found either in it or in the ducts, lead to the recovery of the patient and the removal of the jaundice, the jaundice having apparently been caused by an inflammatory occlusion of the hepatic duct, which was cured by a drainage of the inflamed gall-bladder, this drainage draining the ducts also. From facts of this kind the question may be asked if Hanot's pure type is at all deserving of a special clinical position, and if it is not possible that most of the cases so classed were set up by a primary coarse lesion to a duct by the passage of a stone. At the same time, the possibility of a true primary infective cholangitis cannot be entirely put aside as never occurring, especially in view of the fact that the occurrence of a true primary infective cholecystitis is, I take it, now clearly established.

If the foregoing argument is based on well-established facts, which I believe it is, the questions surrounding liver cirrhosis would be resolved as follows:—

The primary and most important phenomenon would be the presence of, or the time of the development of, jaundice. If there were no jaundice, or if it supervened as a late symptom, the liver might be large or small, and the terms "hypertrophic" and "atrophic" may be applied as hitherto. It ought, however, to be clearly understood that these terms signify nothing more than size.

If, on the other hand, jaundice be an early and a marked feature, and the liver be enlarged, then Hanot's term, "hypertrophic *biliary* cirrhosis," ought to be applied to the condition. This, according to the preceding argument, is true *biliary* cirrhosis, and usually presents itself as a clinical entity with early jaundice, enlargement, and no ascites; and as a pathological entity characterised by enlargement, bile coloration, a finely granular surface, a monolobular cirrhosis, and an increase of so-called bile ducts in the portal spaces. This "biliary cirrhosis" is, I think, always "hypertrophic," meaning thereby enlargement. The condition to which we would thus confine Hanot's term is, as we have seen, identical in its clinical and anatomical characters with "obstructive biliary cirrhosis," as produced experimentally in animals and as found not infrequently in man. It has indeed been further shown in this connection that in the small number of cases in which a cause for the jaundice had not been determined that it was almost certainly due to blockage of the bile ducts from a primary and initial inflammation of them, or secondary to an antecedent and perhaps overlooked history, indicating the passage of a gall-stone. The infective nature of some cases of the typical Hanot's hypertrophic biliary cirrhosis has been investigated recently by N. N. Kirckow (*St Petersburger Med. Woch.*, No. 38, 1900) and others, but the bacteriology of the condition cannot at present be gone into.

All this, however, leads to a matter of very great practical interest, and that is the clinical significance of the "atrophic" and "hypertrophic" cirrhosis, as I have defined them, and which are not associated with early and marked jaundice; or, in other words, the significance of cirrhosis with the liver enlarged in one case and diminished in size in another. The latest utterance on this question, so far as I know, is to be found in Dr Cheadle's Lumleian Lectures, to which reference has already been repeatedly made. The outcome of his experience is to show that if enlargement is due to syphilis it can be treated with marked success; further, that cirrhosis with enlargement, even when

unmistakably alcoholic in origin, yields more satisfactory results from repeated tappings and other appropriate measures than cirrhosis with atrophy. He holds that the enlarged liver indicates a more acute cirrhosis, and that it is in virtue of this fact that treatment is more successful than in the chronic atrophic form. This gives a practical and a therapeutic differential importance to the "atrophic" and the "hypertrophic" cirrhosis if the term "hypertrophic" is to be accepted as having this restricted application.

I have not dealt in detail with syphilitic cirrhosis, for it does not occur as a diffuse condition in the adult. Hepatic symptoms due to syphilis are the outcome of gumma, the cicatrices they leave, and of perihepatitis and the adhesions and contractions caused thereby.

SURGERY

THE SURGICAL TREATMENT OF ASCITES DUE TO CIRRHOSIS OF THE LIVER

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"THE cases are so hopeless, the technique so simple, the dangers so trivial, and the outlook so promising, that the prospects of this mode of treatment becoming an established one seem bright." The operation of which Frazier speaks so confidently is one of the most ingenious and—what is almost implied in that—one of the most simple in modern abdominal surgery; and yet, though at the suggestion of Talma of Utrecht the first operation was performed twelve years ago, only twenty-four cases are on record. The procedure is founded on the "mechanical" theory of the production of ascites in cases of cirrhosis of the liver; the contracted liver obstructs the portal circulation, such obstruction produces backward pressure and "oozing" of fluid from the ramifications of that circulation, and so ascites results; therefore, divert some of the portal blood into the systemic circulation by causing adhesion to form between the abdominal wall on the one hand, and the liver, spleen, omentum, etc., on the other, and the ascites should be relieved. Such is the theory. How has it been acted on, and with what results?

Experiments.—Tilmann undertook a series of experiments on dogs to prove the value of peritoneal adhesion in forming a collateral circulation. When he ligatured the portal vein, or the mesenteric vein above the junction of the gastric or splenic, the

dogs always died. But in one dog he partially stripped the peritoneum from the abdominal wall and placed the omentum between the wall and the peritoneum. After adhesions had formed, the abdomen was opened and the mesenteric vein ligatured. The dog suffered from profuse hæmorrhages from the bowel, but recovered. Eight days later the abdomen was again opened, and the portal vein ligatured close to the liver. The stools became bloody again, but the dog recovered, while innumerable small veins appeared on the abdominal wall. Such an experiment clearly indicates the possibility of peritoneal adhesions developing numerous and efficient channels of communication with the veins, and also the value of such communications when the portal system is obstructed.

Some experiments were made by other observers with a view of watching the effect of diverting *all* the portal blood directly into the vena cava, and preventing it passing through the liver. The portal vein was ligatured close to the liver, and a communication was established between it and the vena cava. Many of the dogs died, but twenty recovered and were studied, with results of interest. "A considerable number of dogs showed an immediate change in disposition, which lasted for a longer or a shorter period. Gentle and obedient dogs became cross, peevish and disobedient, and some so fierce that they could not be approached. Stages of excitement and depression followed each other, the ataxic gait was noticed, and stupor, coma and convulsions were present. Such symptoms were sometimes followed by death, but often the dog entirely recovered. They appeared as a rule immediately after operation, but occasionally were delayed for days. The temperature following operation was always sub-normal, and the following day it would rise one or two degrees and remain there for ten or fifteen days. Some dogs lost progressively in weight until their death; others kept their weight, or even gained. When a dog was fed with meat the above symptoms speedily appeared, sometimes with a fatal result; when fed with nitrogenous foods they seemed perfectly well. Such phenomena resemble closely a toxæmic or uræmic condition in man, and seemed to be the result of nitrogenous foods. The experiments teach us that if portal blood is to be brought directly into the systemic circulation this should be done gradually, in order to avoid an overwhelming toxæmia; and also when a collateral circulation is established and our patient shows signs of excitement or depression, nitrogenous food should be reduced or entirely cut off for a period of time" (Le Conte).

Natural Collateral Circulation.—Most writers, apparently founding on the description in Sappley's Anatomy, give the

normal communication between the portal and systemic venous systems as follows :—One set of veins running in the folds of the hepatic ligaments connect the portal trunk with the phrenic veins and azygos major; another set runs in the round ligament and communicates with the epigastric veins, and with the intercostal and other veins in the abdominal wall; the coronary veins through the œsophageal plexus communicate with both azygos veins, and the inferior mesenteric vein through the middle and inferior hæmorrhoidal plexus communicates with the internal iliac veins. Talma has recorded three cases in which this collateral circulation was easily demonstrated. All three patients had at one time suffered from ascites, which, however, disappeared before death. One died from toxæmia, due to the progress of the disease, another from a stab of the abdomen, and the third from acute bronchitis. Each of them showed at the autopsy a well-established collateral circulation, in one case the vein in the round ligament being "as large as a finger." This collateral circulation may be helped by adhesions forming between the abdominal wall and the viscera, such as the intestine, liver and spleen; and in cases where cirrhosis of the liver was *not* accompanied by ascites, *post-mortem* examination frequently showed the presence of such adhesions. In cases in which ascites has at last disappeared after frequent tappings, these tappings may very probably have brought about such adhesions.

The Operation.—Various incisions have been used, but the best seems to be a median one between the sternum and the umbilicus. If it is desired to make the incision lateral with a view to getting readier access to the liver, it should be an oblique one under the right costal margin; the linea semilunaris has been chosen, but I think that should certainly be avoided as it tends to hernia by dividing the nerves to the rectus and so paralysing that muscle. Le Conte advises an incision a little to the left of the median line in order to avoid injury to the vein in the round ligament. "The liver is then inspected and palpated to confirm the diagnosis. A small opening in the median line above the pubes is made, and through this the fluid is siphoned off while the operation above is being completed. The parietal peritoneum over the omentum, liver and spleen (if the latter organ is enlarged) is dried and gently rubbed with a gauze sponge, the same treatment being also given to the surfaces of the organs. Rougher handling is entirely unnecessary, as a healthy peritoneum when brought in contact with dry gauze for a fraction of a minute will retain the impression of the gauze mesh. The omentum is then stitched in two or three places with catgut to the anterior

abdominal wall, and the incision closed. . . . Drainage may be made through the lower opening, particularly in cases where the ascites has been rapidly reaccumulating. . . . Drainage is very useful for three or four days, until the adhesions can become firm" (Le Conte).

Cases and results.—Though Talma was the first to suggest this operation, the idea seems to have occurred independently to Drummond and Morison of Newcastle, and Morison has the credit of being able to record the first successful case. Twenty-four cases seem to have been recorded, with nine complete recoveries, making 40 per cent. of recoveries. Nearly 14 per cent. were unimproved, and about 9 per cent. were improved. But if certain eliminations are made which may quite fairly be made, the percentage of cures mounts almost to 64. Some of the records are extremely interesting, and the recoveries brilliant. In cases of Morison's and Le Conte's the patients showed symptoms of depression or excitement corresponding to those seen in the experiments on the dogs which I mentioned, due apparently to much of the portal blood entering the systemic circulation without being subjected first to the antitoxic action of the liver.

Rolleston and Turner think medical treatment should be suspended in favour of operation whenever the diagnosis of cirrhotic liver is made. Morison believes that tappings in such cases should not be persisted in, but that early operation is advisable. Talma holds the same view. I think that such views expressed by such men certainly constitute a claim for an extended trial of the operation in suitable cases.

The best account of the literature is given in Packard and Le Conte's paper in *The American Journal of the Medical Sciences*, March 1901.

GYNECOLOGY AND OBSTETRICS

THE TREATMENT OF RUPTURE OF THE UTERUS

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IN the treatment of so formidable an obstetrical accident as rupture of the uterus, where promptness and decision are a *sine qua non* to success, the choice of many methods of treatment may be disadvantageous. This drawback has been increased since hysterectomy (abdominal and vaginal) has recently been so frequently carried out in the treatment of this complication.

Rupture of the uterus being comparatively rare, the records from a single hospital are not sufficiently numerous to be accepted as of great value in estimating what is the best treatment to adopt. Merz (*Archiv. f. Gynäk.*, Bd. 44) collected all the published cases between 1870-1893, a total of 230 cases, and more recently Klein (*Archiv. f. Gynäk.* 1901, Bd. 62) has continued this collection up to 1900, giving a total of 381 cases. Although successful treatment depends on many other things besides the method used, yet Klein's work on the "operative *versus* non-operative treatment of rupture of the uterus" deserves careful study. It is by far the most exhaustive collection of cases yet published, and its value is greatly increased by every individual case being shortly described. In a summary such as this it will be impossible to give in detail all the conclusions arrived at, but the more important may be considered.

Klein describes—(1) *Cases of uncomplicated rupture of the uterus treated by operation:* total, 149. Of these 83 = 56 per cent. recovered; 66 = 44 per cent. died. Nature of operation:—Cœliotomy, 133 cases: 73 = 55 per cent. recovered; 60 = 45 per cent. died. Cœliotomy followed by vaginal hysterectomy, 2 cases: both recovered. Vaginal hysterectomy, 7 cases: 3 recovered. Sutured *per vaginam*, 6 cases: 3 recovered.

Of the 133 cœliotomies, 64 primary (*i.e.* performed before the birth of child *per vias naturalis*), 67 secondary.

Of 64 *primary*—37 (or deducting 2 cases followed by vaginal hysterectomy) 35, 56 per cent. recov.
27, . . . 42 „ died.

In 27 cases where uterus was not removed, in—
19 cases tear sutured, 10 deaths, 53 per cent.
8 „ not sutured, 2 „ 25 „

In 35 cases the uterus was removed—
in 29 supra-vaginal amputation, 13 „ 45 „
In 6 cases total extirpation, . 2 „

Secondary cœliotomy, 67 cases, of which 36 = 54 per cent. cured.

In 33 cases the uterus was not removed—
Tear sutured, 32 cases, 15 deaths, 47 per cent.
Not sutured, . . 1 case recovered.

In 34 cases where uterus was removed—
26 supra-vaginal, . 11 deaths, 42 per cent.
8 total extirpation, . 5 „ 62 „

Of 25 cases of successful supra-vaginal amputations—
16 extra-peritoneal.
9 intra-peritoneal.

Of 17 fatal cases—11 extra-peritoneal.
6 intra-peritoneal.

Giving, therefore, a mortality of about 40 per cent for both methods.

There were 117 cases of *complete rupture* of the uterus treated by *primary cœliotomy* of which 54=46 per cent died.

Of those where uterus was retained in—
17 cases tear sutured, 9 deaths.
7 cases no suture, 2 deaths.

Where the uterus was removed by—
Supra-vaginal amputation, 26 cases, 12 deaths, 46 per cent.
Total extirpation, 6 „ 2 „
Secondary extirpation, *per vaginam*, 2 cases recovered.

Secondary cœliotomy with retention of uterus—
27 cases (tear sutured), 13=48 per cent died.
1 case (tear sutured), not recovered.

Where uterus was removed there died of—
24 supra-vaginal, 11=46 per cent.
7 total extirpation, 6=71 per cent.

The cœliotomy results in *incomplete rupture* were in—
14 cases, 4 deaths=29 per cent.

Of those after primary cœliotomy where the uterus was retained in 2 cases the rent was sutured with one death, and in one case where the rent was not sutured patient recovered. In 3 cases where the uterus was removed by supra-vaginal amputation one died.

Secondary cœliotomy with retention of uterus—
Suture of tear, 5 cases, 2 deaths.

Where uterus was removed—
Supra-vaginal, 2 cases, no deaths.
Total extirpation, 1 case recovered.

The total results from these figures show—

In complete rupture with primary cœliotomy, . . .	mortality	=43 per cent.
In complete rupture with secondary,	„	49 „
In incomplete rupture with primary,	„	33 „
„ „ secondary,	„	25 „

Klein compares the results in cases of violent as contrasted with spontaneous ruptures treated by cœliotomy and finds in—

16 complete violent cases,	5 deaths	=31	per cent.
5 incomplete „	„ 1 „	20	„
73 complete spontaneous,	30 „	41	„
3 incomplete „	1 „	33	„

The better results obtained in violent ruptures is probably due to such cases coming earlier under treatment.

Total extirpation *per vaginam* has (up to 1900) been performed 9 times—

7 primary, 4 died (hæmorrhage).

2 secondary, both recovered (after abdominal section).

Of six cases sutured *per vaginam*, three died.

The advantage of avoiding if possible the patient's removal to hospital is shown by the following figures:—

Operated on within two hours at home, 84 per cent recov.
„ later than two hours, 58 „ „
Removed to hospital within two hours, 63 „ „
„ „ at a later period, 44 „ „

If we take the general mortality of cases treated within two hours as 29 per cent., then by avoiding transport this, according to Klein, may be reduced to 16 per cent.

(2) *Uncomplicated rupture of uterus treated without operation.*

198 cases—96 = 48 per cent. recovered.
102 = 52 „ died.

Of 70 cases where no treatment was carried out 51 = 73 per cent. died. Three cases were treated by an abdominal bandage only, two of which died.

In 125 cases—

42 drainage by tube or gauze, 35 recovered, 83 per cent.
65 plugged, . . 31 „ 48 „
18 simple irrigation, . 10 „ 55 „

The general results by *complete rupture* were—

77 cases—43 = 56 per cent. recovered.
33 = 44 „ died.

Incomplete rupture—

35 cases—22 = 63 per cent. recovered.
13 = 37 „ died.

Violent rupture—

17 complete, 7 = 41 per cent. died.
10 incomplete, 3 = 30 „ „

Spontaneous rupture—

38 complete, 20 = 53 per cent. died.
16 incomplete, 6 = 33 „ „

The influence of the position of the rupture is shown as follows:—

Complete rupture—

15 anterior wall, 9 = 60 per cent. died.
35 lateral „ 17 = 49 „ „
12 posterior „ 3 = 25 „ „
5 circular „ 2 = 40 „ „

		Drained.	Plugged.	Irrigated.
Of 6 recoveries,	anterior wall,	1	4	1
18 „	lateral „	7	8	3
9 „	posterior „	5	3	1
3 „	circular „	2	1	—
Of 9 fatal cases,	anterior „	2	6	1
18 „	lateral „	5	11	2
3 „	posterior „	—	2	1
2 „	circular „	—	1	1

Of *incomplete rupture*—

5 anterior wall, 1 = 20 per cent. died.
22 lateral „ 7 = 32 „ „

		Drained.	Plugged.	Irrigated.
Of 4 recoveries,	anterior wall,	1	2	1
15 „	lateral „	8	5	2
Of 1 fatal case,	anterior „	—	1	—
7 „	lateral „	—	4	3

The results from treatment at patient's home, as contrasted with those after removal to hospital, are given thus:—

25 home—Recovered, 12 = 48 per cent.
Died, 13 = 52 „
Of 12 recoveries—6 drained, 5 plugged, 1 irrigated.
28 klinik alone—Recovered, 14 = 50 per cent.
Died, 14 = 50 „
Of 14 recoveries—5 drained, 7 plugged, 2 irrigated.
20 attempts at delivery and subsequent removal to hospital—
Recovered, 16 = 80 per cent.
Died, 4 = 20 „
Of 16 recoveries—4 drained, 7 plugged, 5 irrigated.
9 delivered at home and treated in hospital—
Recovered, 7 = 78 per cent.
Died, 2 = 22 „
Of 7 recoveries—4 drained, 2 plugged, 1 irrigated.
Of cases treated within two hours at patient's home—
Recovered, 12 = 46 per cent.
Died, 14 = 54 „
Longer than two hours—
Recovered, 7 = 47 per cent.
Died, 8 = 53 „
Removed to hospital and treated within two hours—
Recovered, 14 = 64 per cent.
Died, 8 = 36 „
Treated at later period than two hours—
Recovered, 13 = 77 per cent.
Died, 4 = 23 „

From these figures the best results would appear to be got in those cases removed to hospital and treated some time after the rupture has occurred.

(3) If we compare the results of cases operated on with those treated by drainage, etc., we find that of the former 44 per cent. and of the latter 39 per cent. died. In the cases where no treatment was carried out the mortality was as high as 73 per cent., showing clearly that in every case some treatment should be attempted. The mortality from cœliotomy was 45 per cent., and it made little difference as regards results whether this was primary or secondary. In 18 cases not operated upon and where the rupture was simply irrigated the mortality was 45 per cent. As this method has practically no influence in arresting hæmorrhage or preventing infection, it is to be regarded as useless. Of 42 cases treated by drainage by far the best results were obtained when the rubber tube was used, viz., mortality 17 per cent. In spite of this favourable result, the tube has been given up since 1890 in favour of gauze plugging, but with unsatisfactory results, as shown by the fact that of 65 cases so treated 52 per cent. died. Klein holds that the manipulation necessary for the proper introduction of gauze is frequently followed by a recurrence of hæmorrhage.

The importance of operating early is shown by the following:—Of cases treated within two hours after the rupture the mortality was 29 per cent. as contrasted with 56 at a later period. Further, if the patient was not removed the mortality was 28 per cent., as compared with 51 per cent. when the patient was taken to the hospital. In non-operative cases delay and transport do not seem to have the same evil effects. The mortality of cases treated within two hours was 46 per cent., against 38 per cent. where the treatment was carried out at a later period. If the patient was not removed to the hospital the mortality was 51 per cent.; if removed only 27 per cent. Of 40 per cent. fatal cases treated within two hours, 80 per cent. were treated with gauze plugging and only 4 per cent. drained. Of 38 per cent. of fatal cases treated at a later period, 66 per cent. were plugged and 34 per cent. were drained.

In complete rupture the results of operation and no operation were about the same (46·44 per cent.), whereas in incomplete ruptures the operative treatment gave 29 per cent., the non-operative treatment 57 per cent. mortality. The best results in the latter were obtained from simple drainage.

In cases where the child had escaped into the abdomen the puerperal risks do not appear to be affected when delivery takes place per vias naturales and there is no evidence that the rupture is thereby increased in size. By secondary cœliotomy the

mortality was 14 per cent., by non-operated cases 37 per cent., and from primary cœliotomy 42 per cent. In cases of complete rupture treated by operation those involving the lateral walls gave the best results—mortality 35 per cent., as contrasted with 67 per cent. when the posterior wall was involved. In cases not operated on ruptures of the posterior wall give the best results —25 per cent., as contrasted with 60 per cent. when the anterior wall was involved. In incomplete ruptures those involving the anterior wall give the most favourable results. If we compare those figures with previously recorded statistics, we find that in 1886 Jaille gave the mortality in non-operated cases as 71 per cent., as contrasted with 31 per cent. in 38 cases where cœliotomy had been performed. In 1889 Schäffer collected 52 cases where the child had escaped into the abdominal cavity, giving a mortality of 64 per cent. Piskacek found in 23 cœliotomies a mortality of 60·8 per cent., in 57 non-operated cases a mortality of 56·1. Schultz in 1891 found that of 60 cases where treatment was expectant 80 per cent. died, of 70 plugged or drained 64 per cent. died, and of 193 cœliotomies 55·3 per cent. died. In 1893 Merz gave the mortality of cœliotomy cases as 50 per cent. Klein finds that from 1890 onwards the mortality after cœliotomy was 37·5 per cent. Those figures show that the results from cœliotomy have steadily been improving, the results in non-operated cases remaining practically the same (39 per cent.). This is probably explained by the fact that during the past ten years more cases have been operated on than formerly, so that many of the less extensive ruptures now operated on lower the mortality.

Although drainage gives a mortality of only 17 per cent., yet it must not be recommended exclusively. In acute bleeding cœliotomy is preferable. Klein believes that the mortality might be reduced to 6 per cent., given the following conditions: —(1) Suitable surroundings so as to avoid removing the patient; (2) when the patient is not too prostrate from loss of blood; (3) knowledge of the technique on the part of the operator.

In cases of rupture of the uterus with the patient undelivered Klein recommends delivery *per vias naturalis*, when this can be done without delay. He does not think that primary cœliotomy is imperative, because the child has escaped entirely or partially into the abdominal cavity. After delivery the size and position of the rupture must be ascertained, as on this depends the line of treatment to be adopted. If the hæmorrhage is very slight, Klein recommends the introduction of a drainage tube, watching the patient for six hours. If the bleeding is so profuse as to demand operation, then if the rupture is laterally situated cœliotomy must be performed without any consideration of its

size. In the absence of infection the wound may be sutured. An unhealthy condition of the edges of the wound demands supra-vaginal amputation with intra-peritoneal treatment of the stump in the absence of evidence of infection. If the patient is already delivered, the amount of hæmorrhage must be our guide for the line of treatment. If severe, cœliotomy must be performed at once; if slight, the drainage tube may be used as already stated. Klein does not recommend suturing the rupture *per vaginam* on account of the difficulty and the danger of suppuration behind the sutures setting up peritonitis. Klein has collected 19 cases where the rupture involved the vagina. Of those 10 recovered = mortality of 47 per cent.

In 4 cœliotomy, 2 deaths.
In 5 sutured *per vaginam*, 1 death.
In 1 drained, died.
In 5 plugged, 2 deaths.
In 1 irrigated, recovered.
In 3 expectant, all died.

Excluding the last three cases, only in one was the rupture incomplete. In 15 complete ruptures—

4 cœliotomy, 2 deaths; of the two recoveries, supra-vaginal amputation, with extra-peritoneal treatment of the stump, was the method used, with suture of the vaginal tear.

In 4 cases the tear was sutured from the vagina with 3 recoveries, and of 4 cases plugged 2 died. We cannot, of course, draw definite conclusions from this series. Having done primary cœliotomy, the tear must be treated either by drainage through the vagina, or if circular, by total extirpation. If delivery has taken place *per vias naturalis*, an attempt should be made to suture the rent *per vaginam* (Evake).

Cases of rupture of the uterus, complicated with tears of the bladder, constitute one of the gravest obstetrical accidents. Of 15 cases only 2 recovered, giving a mortality of 87 per cent. Of the 2 cases that recovered, it is uncertain whether the rupture was complete or incomplete, but both were treated with gauze plugging. Two fatal cases were incomplete. In the remaining 11 cases the rupture was complete. Of those cœliotomy was performed four times. Klein recommends in such cases cœliotomy, careful suture of the bladder wound, and the treatment of the uterine rupture according to the conditions found.

DISEASES OF CHILDREN

By R. G. M'KERRON, M.A., M.D.,
Senior Physician, Royal Hospital for Sick Children, Aberdeen

Hæmorrhage into the Suprarenal Capsule in Still-Born Children and Infants.—Since Mattei in 1863 first drew attention to the frequency with which visceral congestion or hæmorrhage was found in still-born children, several observers have contributed to this important subject. Notably we have the valuable investigations of Spencer, who in the *Obstetrical Transactions* of 1891, gives a detailed account of a consecutive series of 130 autopsies on fresh, mostly still-born fœtuses. With few exceptions congestion or hæmorrhage of some viscus or organ was found in all. To the *post-mortem* appearances Spencer adds the leading clinical features of the labour with the view—and this is the main object of his paper—of throwing light on the causation of still-birth. He shows that congestion and hæmorrhage are not only more frequent, but more extensive the more difficult the labour and the less mature the fœtus, but he is of opinion that after all difficult labours there will probably exist some degree of visceral congestion. He lays down a series of practical rules for the management of labour, the aim of which is to lessen this tendency. With this obstetric aspect of the question we are not here concerned. As to the causation, into which he enters at length, he regards as the one essential feature, though there may exist other contributing factors, the normal delicacy of the fœtal vessels. Those viscera are most liable to be affected which contain a large quantity of delicate vessels but feebly supported by the surrounding tissues. An important organ in which these conditions obtain is the suprarenal capsule. Congestion of one or both of these was found by Spencer in fifty-three cases, in about one-half of which hæmorrhage also was present.

In the *Archives of Pediatrics* (February and March) Hamil records three cases of hæmorrhage into the suprarenal capsule which were observed by himself, at the same time adding a synopsis of all the cases, eighty-seven in number, which he could find in literature. Though the great majority of these were still-born or died soon after birth, several lived for a considerable period, while in a few in which death did not occur for several months the hæmorrhage seemed to have no direct connection with parturition. While in general agreeing with Spencer's views as to the causation of this form of hæmorrhage, Hamil briefly summarises his own conclusions. The most common causes in still-born children are probably prolonged and difficult labours,

those requiring manipulations, and especially those requiring delivery by the breech. In practically all cases dying after the tenth day, some form of infection produces the condition.

These etiological considerations are of great obstetric interest, but what is more important from our present point of view is—(1) Can we recognise hæmorrhage into the suprarenal capsule during life? (2) What is the effect on the economy of those minor lesions which do not prove directly fatal?

In regard to the first question, Hamil notes that in the cases reviewed there were no symptoms which seemed in any way related to the lesion. Most observers regard the condition as impossible of recognition, though in a few a distinct tumour was detected in the lumbar region, and this, where sudden symptoms of collapse arise, should suggest the possibility of suprarenal hæmorrhage. In Hamil's first case the child was apparently quite healthy till the second day, when it became collapsed and very pale, and his temperature was found to be 103. He was evidently in pain, and died on the fourth day. The autopsy showed that prior to birth hæmorrhage had taken place into the capsule, which had ruptured on the second day, resulting in a fatal secondary hæmorrhage into the peritoneal cavity. These facts are of use in helping to explain the cause of death in those cases, so disappointing to the parents and practitioner, where the child, at first seemingly healthy, soon manifests serious symptoms which prove rapidly fatal.

From the frequency with which hæmorrhages are met in still-born children, and from the fact that they may be found in children dying even after easy labours, the conclusion is obviously warranted that they must often occur in children who survive. Indeed, that this is so we have evidence in one of the cases collected by Hamil, where a child died of broncho-pneumonia at the age of two months, and the autopsy revealed an old hæmorrhage into the medulla of one suprarenal. Similar cases are probably common. That the resulting changes interfere in greater or less degree with the function of the gland is probable, but how far they do so, and what influence they exercise on the health and nutrition of the child, it is impossible in the present state of our knowledge to say. The subject opens a wide field for useful investigation.

It has been suggested that these lesions, by inducing fibrosis or by exposing to infection by the tubercle bacillus through diminished vitality, may be important factors in the production of Addison's disease. It is possible, too, that we may find here an explanation of some, at least, of the sarcomatous growths met with in young children.

The relationship of these early hæmorrhages to the health

of the infant and to disease in general is of obvious importance, but from lack of knowledge cannot meantime be definitely determined.

Secondary Infection in Children.—Baginsky (*Archiv. f. Kinderh.*) gives a very full clinical and pathological description of six cases of secondary infection in young children, the oldest being under two years of age. These form a useful contribution to a subject which at the present time is engaging attention. Much still requires to be done, however, before we are in a position to differentiate clinically the many puzzling forms of mixed infection that are met with in children.

It is impossible to do more than indicate the nature of the infection in the author's cases.

In the first case the clinical symptoms were those of severe septicæmia, complicated by degenerative changes in the skin. There was double pneumonia and albuminuria. The bacillus pyocyaneus was found in almost all the internal organs, but in the lungs, kidneys and spleen it was associated with the staphylococcus aureus, which was found exclusively in the liver. The point of entrance of the bacillus was the nose, which yielded a profuse muco-purulent discharge from which the micro-organism could be separated. The second case was a well-marked instance of fatal invasion of the streptococcus and bacillus proteus, which gained entrance through the lungs. The third case was a combined infection of the diplococcus and streptococcus from a suppurative otitis media. There was secondary affection of the joints and osteomyelitis. In the fourth case scarlet fever was complicated by a virulent form of diplococcus, the site of invasion being undetermined. The two last were cases of measles, associated in the one case, in which a bullous skin eruption appeared with the diplococcus, and in the other with staphylococcus pyogenes and tubercle bacillus, the child having miliary tuberculosis of the lungs and peritoneum.

Infants are more liable than older children to these infections. Secondary microbic invasion, according to the author, presents definite and distinct clinical characters. He protests against classifying these simply as instances of sepsis, holding that the clinical phenomena of the various infections should be recognised. Great care should be taken to guard infants from all sources of infection.

Koplik's Spots in Measles.—When Koplik established the fact that "minute bluish-white spots on a reddened punctate area" appear on the buccal and labial mucous membrane during the invasion of measles, it was hoped that we had here a means

of early diagnosis which might enable us to arrest the spread of epidemics, in hospitals and institutions more particularly. This hope has not been realised, although the value of the spots as an early diagnostic aid must be admitted.

A report of 187 cases of measles is presented by Cotter in the December number of the *Archives of Pediatrics*. Occurring in the New York Foundling Hospital they afforded opportunity for early and systematic examination of the children. The object of the investigation was to ascertain (1) whether Koplik's spots appear regularly; (2) whether they appear *before* any other strong diagnostic feature of the disease; (3) to estimate their value in ordinary diagnosis to the general practitioner, and what is more important in the prevention of widespread infection among aggregations of children.

In regard to the constancy of their appearance, Cotter found that they were present, well marked, in 169 cases, or in just over 90 per cent. In only 8 cases were they entirely absent, in the remaining 10 being present in doubtful form. As to the time of their appearance, Cotter's observations show that in the great majority of cases the spots were recognised only one or two days before the skin eruption. In 78 cases the spots, fever and skin eruption were all present when attention was first directed to the child. Discounting these Cotter notes that of the remaining 90 the spots first appeared one day before the eruption in 54, and two days before in 25. Thus in about 90 per cent. of the cases they were valueless for the purpose of effective isolation. This fact receives a practical illustration from the very epidemic which forms the subject of Cotter's report. Even under the most rigid conditions of quarantine the disease spread universally throughout the institution, and this when the spots were recognised by competent observers as soon as they appeared. In not one case did the spots present the only evidence of the disease which was to follow. There was always along with them a rise in temperature. Not a single case could be isolated on the strength of the spots alone.

It is seldom that the general practitioner, who is not called till the skin eruption is developed, has any difficulty in recognising measles. It may be otherwise in hospital wards where one so often meets with anomalous ill-defined cases among marantic and debilitated children. Here, where Koplik's spots might prove of value in diagnosis, they are more liable to be absent than in cases of a more robust type. It is noteworthy that 5 of the 8 cases in which no spots were detected ended fatally, which would seem to suggest that the spots may prove more important from a prognostic than a diagnostic point of view.

BACTERIOLOGY

"ACID-FAST" BACILLI

By D. A. WELSH, M.A., M.D.,
Pathologist, Royal Infirmary, Edinburgh

IT is a matter of common knowledge that the identification of a specific microbe from its morphological characters and staining reactions alone is often impossible—that, indeed, in the majority of bacteria a microscopic examination can reveal little more than the class to which the organism belongs. But ever since Bacteriology became a recognised science, it has hitherto been considered that there were certain bacteria the recognition of which under the microscope could be effected beyond all reasonable doubt. With advancing knowledge, however, the necessity for greater caution in interpreting the results of microscopic investigations has become more and more apparent. The number of known duplicate or "pseudo" forms has greatly increased, and it is not too much to say that there is hardly any pathogenic microbe whose microscopical characters may not be simulated by some allied or non-pathogenic variety. One has only to think of the many forms that may be mistaken for the gonococcus, for the bacillus of diphtheria, or for the spirillum of cholera, to appreciate the increasing difficulty and uncertainty of a microscopical diagnosis.

But until the last year or two it was generally believed that in the bacillus of tuberculosis, at least, there was an organism whose staining reactions and microscopical characters could be implicitly relied upon to distinguish it from other bacteria. In 1899 Bulloch, who has devoted much attention to this subject, wrote: "Until quite recently the tubercle bacillus has remained unchallenged, and the diagnosis of tubercle from the microscopic examination and the recognition of rods which remain stained after decolorisation by acids, has been accepted unequivocally. The existence of bacilli which when once stained were "fast" to acids, was practically unknown, if we except *bacillus lepræ* and *bacillus smegmatis*. In order to distinguish the tubercle of Koch more certainly, it has been customary to treat the stained preparations with acid and then alcohol, this severe process having little effect on the bacillus, while almost all others are decolorised. And it was universally accepted that a slender bacillus which retained its stain after this severe technical procedure was the genuine *bacillus tuberculosis*. It would now appear, however, that there are quite a number of bacilli which are as "fast" to acids and alcohol as the genuine tubercle bacillus, and it must be acknowledged that this discovery has given a rude

shake to the belief that the microscopic examination of the tubercle bacillus is in itself sufficient to establish a diagnosis of tuberculosis." The practical importance of these observations is obvious, and it may be noted that in the forthcoming British Congress on Tuberculosis one of the subjects for discussion includes the relations of the Bacillus Tuberculosis to other "acid-fast" bacilli.

The term "acid-fast," as applied to bacilli, is based on the discovery by Ehrlich of the fact that the tubercle bacillus when once stained resists decolorisation by strongly acid solutions and by alcohol—that, in other words, the stained bacillus is "fast" to acids and to alcohol. This, indeed, is the basis of the well-known Ziehl-Neelsen mode of staining, which has practically superseded all other methods. It has, of course, long been known that the bacillus of leprosy possessed the same "acid-fast" peculiarity, though in a less degree, and isolated instances of other bacilli with similar staining reactions have from time to time been recorded. But within the last few years a large number of "acid-fast" organisms have been recognised, most of them occurring in such circumstances as rendered them extremely liable to be mistaken for tubercle bacilli. In this brief summary of the leading facts relating to the known forms of "acid-fast" bacilli it will be convenient to classify them roughly as follows:—

1. "*Acid-fast*" *bacilli found in the tissues, secretions or discharges of the human subject.*

In addition to the bacilli of tuberculosis and of leprosy these include other forms obtained from—

(*a*) The respiratory tract (Fraenkel).
(*b*) The intestinal tract.
(*c*) The urinary tract (*e.g.* smegma bacillus).

2. "*Acid-fast*" *bacilli found in domestic animals, and in animal food-products.*

(*a*) In the udders and teats of cows (Murray Cowie).
(*b*) In milk (Bitter).
(*c*) In butter (Rabinowitsch, Petri, etc.).
(*d*) In cow-dung (Moeller).
(*e*) In the smegma of various animals (Murray Cowie).

3. "*Acid-fast*" *bacilli found in a saprophytic condition.*

(*a*) In sewage (Houston).
(*b*) On certain grasses (Moeller).

1 Apart from tuberculosis and leprosy, "acid-fast" bacilli have been observed in various conditions in man. In gangrene of the lungs the occurrence of organisms resembling but not identical with tubercle bacilli was described in 1898 by Fraenkel

and by Pappenheim, and in 1900 by Rabinowitsch. In 1899 Moeller observed the presence of acid-resisting bacilli in the mouth and sputum of non-tuberculous patients—an occurrence said to have been previously noted by Zahn.

In the intestinal contents similar "acid-fast" bacilli, believed to be distinct from tubercle bacilli have been mentioned by various observers. A case of special interest was recorded in 1899 by Dietrich, who found "acid-fast" bacilli resembling but quite distinct from tubercle bacilli in a suppurating cyst of the ovary which had ruptured into the intestine—a circumstance which during the life of the patient had led to an erroneous diagnosis of tubercular peritonitis.

In the urinary tract the best-known organism endowed with acid-resisting properties is the smegma bacillus, which may of course be found in urine, and thus on a cursory examination come to be mistaken for tubercle. First described in 1885 by Alvarez and Tavel, this bacillus has been frequently noted, and in 1897 was said to have been cultivated by Laser and by Czaplewski. Conflicting statements have been published as to its morphological and tinctorial resemblances to the bacillus of tuberculosis—the usual inference being that the similarity is very close. But, as Muir and Ritchie pointed out in 1899, a careful examination reveals distinct differences in both respects. In form this organism is usually distinctly shorter than the tubercle bacillus, and in its staining reactions it again differs by being readily decolorised on exposure to alcohol for one minute after the usual treatment with sulphuric acid. It is said to be quite innocuous when injected into animals.

In regard to the "acid-fast" bacilli occurring in man, it may, therefore, be said that, with the exception of the organisms of tuberculosis and of leprosy, they have not been thoroughly studied. In most instances their mere presence is all that has been noted, and the smegma bacillus in particular has not yet been satisfactorily investigated.

2. In various domestic animals, and in some food stuffs derived from them, numerous examples of "acid-fast" bacilli have lately been described. In 1900 Murray Cowie published a preliminary report in which he stated that in films prepared from scrapings of the udders and teats of healthy cows he had demonstrated the presence of acid-resisting bacilli which were not tubercle bacilli. In all eight cows were examined, with positive results in five and negative in three. On examining the sediment obtained by centrifugalising the milk from eight cases, the same author found that each specimen showed many acid-resisting bacilli, some of which might easily be mistaken for the tubercle bacillus. The results of his experiments on the

cultivation and inoculation of these bacilli have not yet been published.

In butter the presence of "acid-fast" bacilli distinct from those of tubercle has been detected by many different observers, some of whom have been successful in obtaining pure cultures and in producing granulomata after inoculation. One of the first to make a systematic examination of various samples of butter was Rabinowitsch, who in 1897 isolated an "acid-fast" bacillus which was capable of growing in all ordinary media, thus presenting a marked contrast to tubercle. Intra-peritoneal inoculation of guinea-pigs with butter containing these bacilli gave rise to nodular overgrowths, which to some extent resembled a tubercular infiltration. Under the microscope, however, no caseation or giant-cell formation was observed. Rabbits and mice appeared to be immune. Two years later Grassberger published some observations which materially supported these results. He introduced samples of market butter into the peritoneal sac of guinea-pigs, and in half the animals inoculated he found similar tissue changes. In the nodules produced there were numbers of acid-resisting bacilli which he was able to cultivate in a pure condition. Meantime Obermüller had declared that in each of fourteen samples of butter examined he had found actual tubercle bacilli. This statement, which one author aptly terms "disquieting," was adversely criticised by Petri, who found acid-resisting bacilli similar to the butter-bacillus described and isolated by Rabinowitsch.

During the years 1898-99 further contributions to this important question were supplied by Hormann and Morgenroth, Korn, Herbert, Ascher, Weissenfeld, and others. While there was very considerable variation in detail, the main points established by their results were that "acid-fast" bacilli may frequently be found in butter; that in some samples tubercle bacilli were apparently present, whereas in others the bacilli obtained resembled those of tubercle in form and staining, but differed in cultural characters and in pathogenic properties. Commenting upon these statements regarding the butter-bacillus, Bulloch says: "The chief 'acid-fast' tubercle-like bacilli are evidently very widely distributed. . . . It is quite possible that articles of diet, especially those derived from animals, may become contaminated, and lead to an erroneous diagnosis of tubercle. Judging from the conflicting accounts of the examination of butter by Petri, Obermüller, Korn, Hormann and Morgenroth, and Lydia Rabinowitsch, this would appear to have already taken place."

Several observations have been recorded of the presence in animal fæces of bacillis which resist decolourisation

by strong acids, and of these the most notable are those of Moeller, who succeeded in isolating and cultivating an "acid-fast" bacillus from cow-dung. In its cultural and parasitic behaviour it presents certain minor differences both from the tubercle bacillus and also from other acid-fast organisms obtained by the same author from grasses. Lubarsch, Kretz, and others, have confirmed the essential accuracy of Moeller's work.

Quite recently Murray Cowie has undertaken a bacteriological examination of the smegma of various animals and demonstrated the fact that acid-resisting bacilli occur in many of them, *e.g.* horse, cow, dog, guinea-pig, and white rat. In the cat and rabbit no such organisms were detected. He believes that these bacilli are of different species and belong to a group of organisms having common staining properties.

Since "acid-fast" bacilli have been shown not infrequently to occur on the udders and teats of healthy cows, in the excrement of horses and of cattle, and on the genital organs of various domestic animals, it is not at all surprising that they should occasionally also be found in milk and in butter. It is even possible to understand that the flesh of perfectly healthy animals may readily receive such organisms on its surface where, since they are known to grow vigorously on artificial media, they would abundantly flourish. The economic significance of these results is very considerable, and the medico-legal aspects are of the utmost importance in view of the diagnosis of tubercle bacilli in milk, in butter, and on meat exposed for sale. Too often all that is done is to prepare microscopic films, and to stain them according to some routine method for tubercle bacilli. The inadequacy of such a restricted examination is obvious. Much hardship may indeed be inflicted on perfectly innocent persons when prosecuted for selling food which on such insufficient grounds is suspected to be contaminated with tubercle bacilli. Yet the fact must not be overlooked that, though many of these acid-fast non-tuberculous bacilli appear to be quite innocuous, the majority of those examined produce in animals definite pathological effects which in a remarkable manner simulate the lesions of tuberculosis. So far, however, no lesions are known to have been produced by them in man, and some of the lower animals which are highly susceptible to tubercle appear to be immune to the action of these bacilli.

3. That similar "acid-fast" bacilli should also occur in a saprophytic condition is a fact of great interest. In the Reports of the London County Council on the bacterial treatment of crude sewage, Houston states (1) that in crude sewage, in bacterial coke beds, and in the effluents from bacterial beds, there are certain bacteria which, after being stained with hot carbol fuchsin, resist

decolourisation with 33 per cent. nitric acid; (2) that some of these "acid-fast" bacteria cannot with certainty be morphologically distinguished from the tubercle bacillus; (3) that experiments on animals were negative with one exception, in which case the animal died of true tuberculosis.

Of still greater interest, however, are the discoveries by Moeller of "acid-fast" bacilli on certain grasses—one of which he named the Timothy Grass Bacillus, or Grass Bacillus I., and another the Grass Bacillus II. The former was first isolated from infusions of timothy grass and has since been found in other grasses, all of which grasses are said to be widely distributed in temperate climates and extensively used for feeding cattle. Both Moeller and Lubarsch have investigated this organism with great care and find that in most particulars it bears a remarkably close resemblance to the tubercle bacillus. In staining reactions the timothy grass bacillus appears to have in its younger forms at least an even greater resistance to decolourisation by acids than the tubercle bacillus. In cultures it has much the same appearance, but a considerably more rapid growth, and intra-peritoneal inoculation of guinea-pigs gives rise to nodular infiltrations which in a remarkable manner simulate true tubercular lesions. The Grass Bacillus II., as its name implies, was also obtained from grasses. While resembling both the tubercle bacillus and the Grass Bacillus I., it presented certain differences from both. The cultural characters were more analogous to those of avian tuberculosis, and the form of the organism in cultivation was extremely variable, sometimes occurring as branching filaments with clubbing of the free extremities. Inoculation of animals led to fatal results with tissue changes closely resembling those found in experimental tuberculosis.

What the significance of those grass bacilli really is cannot at present be said. It has been suggested that they may represent a resting stage in the life-history of the tubercle bacillus, but nothing is definitely known as to that. The striking resemblance which they bear in so many particulars to the tubercle bacillus serves to emphasise the necessity for more stringent precautions in the diagnosis of tuberculosis than those commonly applied.

LITERATURE.

More detailed references will be found in the writings of Bulloch and Morgan Owen, to both of whom I am indebted for much help in preparing this summary, but the following are among the more important publications referred to in the text:—

1 [illegible]

2 [illegible]

3. Murray Cowie, *Journ. of Exp. Med.* 1900.
4. Czaplewski, *Münch. med. Wochenschr.* 1897.
5. Dietrich, *Berlin. klin. Wochenschr.* 1899.
6. Fraenkel, *ibid.* 1898.
7. Grassberger, *Münch. med. Wochenschr.* 1899.
8. Houston, London County Council—Reports on Bacterial Treatment of Crude Sewage. 1900.
9. Hormann u. Morgenroth, *Hyg. Rundschau.* 1898.
10. Korn, *Archiv. f. Hyg.* 1899.
11. Laser, *Münch. med. Wochenschr.* 1897.
12. Lubarsch, *Zeitschr. f. Hyg.* 1899.
13. Moeller, *Deutsch. med. Wochenschr.* 1898. *Therap. Monatsh.* 1898. *Centralb. f. Bacteriol.* 1899.
14. Muir and Ritchie, "Manual of Bacteriology." 1900.
15. Obermüller, *Hyg. Rundschau.* 1897.
16. Pappenheim, *Berlin. klin. Wochenschr.* 1898.
17. Petri, *Arb. aus d. Kais. Gesundheitsamte.* 1898.
18. Rabinowitsch, *Zeitschr. f. Hyg.* 1897. *Deutsch. med. Wochenschr.* 1899.
19. Weissenfeld, *Berlin. klin. Wochenschr.* 1899.

Meetings of Societies

Forfarshire Medical Association

A MEETING of this Society was held in the University College, Dundee, on Friday, April 5th, at 4 P.M., Dr Havelock, President, in the chair.

Dr Gilruth, Arbroath, gave a short account of some cases of small-pox, and showed a photograph of one of the cases. The relative severity of the symptoms and the relation to the time of vaccination in each case was discussed. Dr Constable of Leuchars discussed some cases he had in his practice, the supposed origin of the disease in his cases, and in Dr Gilruth's cases, viz., by old clothes.

Dr Buist suggested the possibility of infection from other ports. Dr Gilruth replied. Dr Gilruth also showed radiographs of a severe case of rachitic curvature of tibia and fibula from which he had removed wedges of bone with good result. Photographs of the case before and after operation were also shown.

Professor MacEwan showed a specimen of tumour of thigh removed from a woman aged twenty-five, the nature of which was as yet undiscovered. The history and characters of the

tumour did not resemble those of sarcoma or myoma, nor was it connected with bone. There was no history of syphilis.

Professor MacEwan gave an account of three bladder cases. The first was a case of recurrent calculi in the bladder. The patient, a man, had been operated on three times. Eight calculi were removed at the first operation, two, nine months later, and three, nine months later than that. Suprapubic lithotomy was performed twice and lateral lithotomy the third time, as the cicatricial contraction resulting from the previous operations had drawn the peritoneum too far down to allow a suprapubic to be performed successfully.

The second case was one of enlarged prostate treated by double orchectomy with marked improvement. Having had frequency of micturition every hour, the patient was able four months after operation to retain urine for four hours during the day, and all traces of cystitis entirely disappeared. Professor MacEwan reiterated the conclusions he had formed in his paper on this subject read at the British Medical meeting at Carlisle four years ago, and stated his further experience confirmed these, viz., the diminution of the gland; vesical contractibility may return even after some years; and the results were quite as good as those of prostatectomy. These he maintained held good if suitable cases were chosen. The indications for this form of treatment were given. Reference was made to the high death-rate on the introduction of this treatment and reasons given. The mental disturbance after these operations was compared with mental disturbance after operations on other pelvic organs.

The third case discussed was that of a lad aged nineteen, who had suffered from frequency of micturition. There was no stricture and no stone, but the cystoscope showed an ulcer of the bladder. This ulcer was scraped and the bladder drained after median cystotomy. Six weeks after the operation the patient was able to retain urine for six hours. This form of complaint was then discussed shortly. Professor Kynoch, Drs Rust and Gilruth and the President discussed several points in the cases.

Professor C. R. Marshall then spoke on heroin and dionin, pharmacologically and then therapeutically. He pointed out how heroin had a similar effect on the systems as to that of morphine without the latter's depressant effect on the respiratory system. Heroin like morphine relieved the cough, but increased the depth of the respirations, and thus in time slowed the respiration. It diminished the amount of work of the lungs, and increased the length of inspiration. It is ten times more powerful than codeine but not nearly so toxic. Dionin, he said,

was more sedative than heroin, but not so all-powerful; was more powerful than codeine, but its actions were like those of codeine in every other respect. The uses of these substances were thereafter pointed out and the doses given.

New Books and New Editions

Cancer of the Uterus: its Pathology, Symptomatology, Diagnosis and Treatment; also the Pathology of Diseases of the Endometrium. By THOMAS STEPHEN CULLEN, M.B. (Toronto), Associate Professor of Gynæcology in the Johns Hopkins University. Pp. 693, with 11 plates and over 300 illustrations in the text. London: Henry Kimpton. Price 31s. 6d.

WE have learned to expect nothing but good work from the Johns Hopkins University and Hospital, and the volume now before us is only another proof of the highly scientific manner in which the workers in these institutions undertake the investigation of the material which passes through their hands. The book is avowedly written for the benefit of the family physician as an aid to him in the early diagnosis of carcinoma.

The varieties of uterine cancer are classed as follows:—

1. Squamous-celled carcinoma of the cervix.
2. Adeno-carcinoma of the cervix.
3. Adeno-carcinoma of the body of the uterus.
4. Deciduoma malignum.

In describing these forms the author deals in turn with the pathology, clinical history, differential diagnosis, and treatment of each variety. A most extensive and complete record of cases investigated by the author is furnished, and such a record is no doubt of high scientific value. We would venture to submit, however, that for the purposes of the family physician alluded to above the hundreds of case records, showing as they do so much similarity, are hardly necessary.

In the opening chapters, on the anatomy of the uterus and on the removal and examination of uterine tissue for diagnostic purposes, there is much information of a useful description for the inexperienced worker in this field. We are interested to see that the author maintains that "no destruction of the mucosa takes place at the menstrual period."

It is also interesting to note the practice of conducting microscopic investigation at the time of operation, so as to avoid the giving of an anæsthetic twice. Suppose a case of doubtful malignancy. The patient is anæsthetised and curetted, the scrapings are quickly frozen, cut and examined, while all the

while the patient is being prepared for hysterectomy. If malignancy is discovered the operation is proceeded with; if not, the patient is taken back to bed.

The concluding chapters deal with the etiology and prognosis of uterine cancer.

The book on the whole is perhaps chiefly remarkable for the collection of carefully reported cases which it contains, but at the same time the author is to be congratulated on having produced a very lucid and comprehensive monograph on the subject.

The volume is lavishly illustrated, and is printed at the Appleton Press. P. R. Q.

A Text-book of Physiology. By WINFIELD S. HALL, Ph.D., M.D., Professor of Physiology, North-western University Medical School, Chicago. 8vo, pp. 671, 343 engravings, and 6 coloured plates. London: Rebman, Limited. 1900. Price 20s. net.

THIS text-book is intended to have as the root-idea of its arrangement the relation of physiology to anatomy, chemistry, and physics—the three foundations on which the science is built. To each chapter is prefixed an introduction summarising the facts from the basic sciences which are to be utilised in the succeeding text, which is thus freed from ancillary details. The idea is an excellent one, but its execution leaves something to be desired, as the introductions are often too meagre to be of much use to the student unless he has a good knowledge of the subject beforehand. This is especially the case with regard to the histological part of them; the descriptions are always brief, sometimes misleading, and occasionally inaccurate, and the histological figures which are given are a curious mixture of the very latest drawings which have been published, and illustrations which are nearly as old as the microscope, and which should long ago have been dropped out of text-books. It is only fair, however, to say that the former largely predominate. The illustrations of the purely physiological part of the work, on the other hand, are numerous and useful, and one wishes that the author had given more of them and had left all the histological ones out except those which were indispensable. There are also scraps of clinical information scattered here and there which might very well have been omitted.

Apart from these blemishes the book is a good and useful one. The physiological information is up-to-date, is sufficiently full on most points for the student's purposes, and is given in a clear and convincing way. The accounts of metabolism and of the physiology of the nervous system deserve special mention. The book may be recommended to students.

La Tuberculose est Curable. By Dr ELISÉE RIBARD, Member of the Council of Hygiene of the 16th Arrondissement, Paris; attached to the Tubercular Wards in the Hôpital Boucicaut. Crown 8vo, 170 pp., 14 plates and figures. Paris: G. Carré et C. Naud. Price 2 francs.

THIS little brochure is meant to give practical instruction to the heads of families as to how people become tubercular, how the disease is to be recognised in its early stages, and how eminently curable it is at that time. Sections are devoted to the duties of the doctor, the duties of the parents, the duties of the public authorities, and the treatment of tubercular patients. The whole is thoroughly French in its lines of thought and its clear, crisp style; and while some of the recommendations are more Gallic than we should like, the book would well bear translation, and would be useful in this country.

Some of the concluding recommendations are so good and so characteristic that we cannot refrain from translating and appending them.

"Mothers, no more sentimentalism; look at your child, observe him, and if he is weak or ill, have him attended to.

"Doctors, no more falsehoods. Give as quickly as possible a true diagnosis; you know what treatment is necessary, take care that it is carried out.

"Rich men, and as such exposed yourselves to tuberculosis, found sanatoria for the tubercular poor. By doing so, you will not only fulfil a social duty, but you will protect yourselves.

"Magistrates, do your duty in protecting the public health.

"Patients, learn how to take care of yourselves; cure yourselves, for you can do it if you will."

Refraction and How to Refract. By JAMES THORINGTON, A.M., M.D., Adjunct Professor of Ophthalmology in the Philadelphia Polyclinic, etc. London: Rebman, Limited. 1900. Price 7s. 6d. net.

THIS book has been written at the request of the many students who have attended the author's lectures on refraction at the Philadelphia Polyclinic. It is intended for beginners, especially those possessing a limited knowledge of optics, and is fully illustrated with some two hundred illustrations, most of which are newly made. The printing and general get up of the book leave nothing to be desired. The author has succeeded in his endeavour to simplify to the student one of the most difficult subjects in the whole range of medicine, and he has done so in

a clear, lucid, and altogether attractive manner. With very little mental effort the student is carried on by easy stages and by simple and concise explanation till he finds himself face to face with the practical side, namely fitting the ametropic patient with the different forms of lenses.

We need have no hesitation in predicting for it a rapidly increasing popularity both in this country and in America, for the work is a decided success, and reflects credit on author and publishers alike.

Practical Gynæcology. A Handbook of the Diseases of Women. By HEYWOOD SMITH, M.A., M.D. Oxon. Second Edition. Crown 8vo, pp. 230, xxiv., 21 illustrations. London: Henry J. Glaisher. 1900. Price 5s. net.

THIS work is a text-book of gynecology of the older type, a type which has now, rightly or wrongly, almost become extinct. The diagnostic methods are dealt with in the first place, and the author seems still to prefer for the dilatation of the uterus the various forms of tent; then the various diseases of the ovary-tube, broad ligament, uterus, vagina, vulva, and mamma are discussed in a very compressed fashion; lastly, functional disorders and the diseases connected with pregnancy and the puerperium, including post-partum hæmorrhage, are described. In an appendix of remedies several of the minor operations are shortly referred to, such as the application of leeches to the cervix and curetting. The book has little in common with the more ambitious and highly surgical treatises on gynecology which are now-a-days being poured from the press, and possibly there is something to be said for the less radical and more prosaic methods of treatment which have been so much pushed aside.

A Manual of the Diagnosis and Treatment of the Diseases of the Eye. By EDWARD JACKSON, M.A., M.D., Emeritus Professor of Diseases of the Eye, Philadelphia Polyclinic: 12mo, 604 pp., cloth, 10s. 6d. net. Philadelphia: W. B. Saunders. 1900.

THIS is an excellently written and beautifully illustrated manual for practitioners of medicine and students of ophthalmology. There are upwards of 275 illustrations, most of which are made from drawings taken by the talented author himself. The work is certain to become popular in America, where such a work is needed; and in this country it is sure to become a formidable rival to manuals of similar aim and size. IRIS.

The Bacteriology of Every-Day Practice. By J. O. SYME, M.D.Lond., D.P.H., &c., Assistant Physician (late Bacteriologist) Bristol General Hospital. Cr. 8vo, pp. 90. London: Baillière, Tindall & Cox. 1900. Price 2s. 6d.

THIS handy volume points out in what cases the application of bacteriological knowledge may help diagnosis. It describes the elementary methods of bacteriological investigation which every practitioner ought to know and which would enable him who has the time to establish the diagnosis for himself, and it gives clear directions for collecting and preserving for examination the various disease products. Amongst general practitioners there undoubtedly exists a need for information of this kind, and we think the monograph under consideration fully meets such a want.

Editorial Notes and News

Royal College of Physicians, Edinburgh; Royal College of Surgeons, Edinburgh; and Faculty of Physicians and Surgeons, Glasgow.

THE quarterly examinations of the above Board, held in Edinburgh, were concluded on 8th inst., with the following results:—

First Examination, Four Years' Course.—Of two candidates entered both passed the examination:—John Gilmour, Burntisland; and Angus Calder Mackay Macrae, Sutherlandshire.

First Examination, Five Years' Course.—Of twenty-four candidates entered the following eleven passed the examination:—Denis Cregan M'Cabe-Dallas, India; Joseph Millar Gordon Ewing, County Antrim; Henry Edward Bolton, County Dublin; James Wilson, Edinburgh; James Baillie, Dalkeith; Martin Arnold Gibbs, Melbourne; Sydney Buxton Legge, Dundee; James Grieve Cormack, Anstruther; Nicholas Joseph Murphy, County Wexford; Daniel Colin M'Nair, Madras; and Capel Geary Dyer, Hampshire; and two passed in Physics, and three in Elementary Biology.

Second Examination, Four Years' Course.—Of five candidates entered the following two passed the examination:—Jessie Eleanor George, India; and Ernest Taxton, England; and one passed in Materia Medica.

Second Examination, Five Years' Course.—Of twenty-six candidates entered the following sixteen passed the examination:—Minnie Green, Norwich; Robert Septimus Walker, Sunderland; William James Purves, Hartlepool; Thomas Albert Mendes, Calcutta; Lionel Pierre-Marie Alexis, Grenada;

William Black Hendry, Edinburgh; Leo Ferdinando Bianchi, Kent; Joseph Stark, Forth; George Alexander Paulin, Edinburgh (with distinction); William Adams, County Antrim; John St Aubyn Maughan, Grimsby; William Pearson Cowper, Kirkwall; Lilian Mary Grandin, Jersey; Everard Claye, Manchester; Andrew Malachy Walsh, County Waterford; and Edward Rainsford Mumford, Norwich.

Third Examination, Five Years' Course.—Of twenty-three candidates entered the following thirteen passed the examination:—Robert Walter Joseph Pearson, Ireland; John Cyril Curtis, Wales; Wilfred Edwyne Knight, Dublin; William Pennington Grellet, Hitchin; John Searle Burton, Guernsey; William Samuel Rainey Dick, Ballynafil; Lionel Walpole Thomson, India; Herbert Frederic Walker, Tasmania (with distinction); Charles Alexander Bruce-Whyte, Fraserburgh (with distinction); Katharine Charis Davies, North Wales; Frank Edward M'Gee, Melbourne; Valiant Galfred Ffrost, New South Wales; and Thomas Gibbons, Ireland.

Final Examination.—Of fifty candidates entered the following twenty-two passed the examination and were admitted L.R.C.P.E., L.R.C.S.E., and L.F.P. and S.G.:—Raissa Rosenberg, Suivalki; James Cotter, County Cork; John Blunt Swinden, India; Alexander Cameron Campbell, Glasgow; Reginald Peter Nutcombe Buckland Bluett, London (with honours); David Scott Erskine M'Nab, Shotts; James Levack, Caithness; Albert Cuff Lopez, Jamaica; Gerald William Smithwick, Victoria; Leonard Hay Callander, Manchester; Walter Stuart Snell, Jersey; George Bruce Pearson, Fakenham; Catharine Frances Marianne Leach, New Zealand; Walter Henry Swaffield, England; George William Van Twest, Kandy; Frederick Charles Willmot, South Africa; Alexander Brownlee, L.D.S., Edinburgh; Ganesh Dinkar Ukidue, Poona, India; Timothy More O'Driscoll, Skibbereen; John Joseph Hogan Rooney, Dublin; Robert Peel Parker, Preston; and William Henry Eden Brand, Edinburgh; and two passed in the division of Medicine and Therapeutics, three in Surgery and Surgical Anatomy, six in Midwifery, and three in Medical Jurisprudence.

NOTICE.

All communications to the Editorial Department, including Exchanges and Books for Review, should be addressed to THE EDITOR, Dr W. RUSSELL, 3 *Walker Street, Edinburgh, and all business communications, including Subscriptions, Advertisements, &c., to* THE SUB-EDITOR, Dr NORMAN WALKER, 7 *Manor Place, Edinburgh.*

THE SCOTTISH
MEDICAL AND SURGICAL
JOURNAL

NOTES ON THE TREATMENT OF DISEASES OF THE NERVOUS SYSTEM

By J. J. GRAHAM BROWN, M.D., F.R.C.P.Ed., F.R.S.Ed.,
Assistant Physician to the Royal Infirmary of Edinburgh

Lecture V.—On the Treatment of Irritative Diseases of the upper motor neuron

SUMMARY

Symptoms of irritation of the upper motor neuron—their striking character—the obscurity of their pathology—contrast between these and destructive lesions.

Idiopathic epilepsy—seat of lesion—method of production—heredity—predisposition—exciting causes—peripheral irritation—toxines—alcohol—toxines of infective disease—auto-intoxication—toxicity of urine and of blood.

Prophylaxis of epilepsy—treatment of the disease—diet—occupation—general rules—use of bromides—mode of action—dose—signs of bromism—class of case in which bromide treatment useful—special method of administration—bromipin—digitalis—other drugs.

Treatment of the epileptic convulsion itself—the "status epilepticus"—chloroform—chloral—amylene hydrate—the operative treatment of idiopathic epilepsy.

Symptomatic epilepsy—causes—treatment—bromides—operative treatment—determination of where to trephine—results of operative interference.

Eclampsia in children—causes—relations to adult epilepsy—treatment—during the fit—and subsequently.

Tetany—its nature—toxine action—rickets—treatment—removal of cause—allaying the spasm.

Chorea—forms of—method of production—predisposition—over-pressure at school—fright—pregnancy—toxic action—rheumatism—endocarditis—position of the morbid process.
Treatment of chorea—rest—general management—nursing—arsenic—dosage—other remedies—sedatives—treatment in convalescence.

THE symptoms due to irritation of the upper motor neuron are usually distinct and even striking. Convulsions, complete or partial, athetosis, chorea, are conditions which are readily recognisable by the physician, and which strongly impress and engage the mind of the patient or his friends.

But while, from a clinical point of view, these are salient features in any case in which they occur, from the side of pathology they frequently present great obscurity. In this respect they contrast in a marked way with those lesions of this neuron which produce paralysis. In the latter the method of origin of the lesion and the way in which it acts in causing the paralysis are in most cases fairly clear to us. In cases of irritation of the neuron there is seldom such clearness.

Let us, in the first place, consider cases of so-called idiopathic epilepsy, a group which is gradually being diminished in numbers as the causation of the disease is becoming better understood. In spite of the observations of Kussmaul and Tenner, of Nothnagel, of Luciani, of Unverricht, as well as the more recent experiments of Prus,[1] which point to the origin of the disease in the central ganglia, the pons and the medulla, the view is now generally held that the convulsions which characterise epilepsy are the outward expression of explosions of nerve energy in the grey matter of the cerebral cortex. The acute clinical observations of Hughlings Jackson in elucidating the pathology of partial convulsions, taken along with the experiments of Fritsch and Hitzig, who showed that such convulsions could be artificially produced by stimulation of the cortex, leave little doubt in the mind as to the mechanism of the general disease. But while this is so, it is not easy to

[1] Prus, "Ueber die Leitungsbahnen und Pathogenese der Rindenepilepsie," *Wiener med. Wsch.* 1898, p. 856; also "Ueber elektrische Reizung der Vierhügel," in the same Journal, 1899, p. 1124. Prus also holds that the impulse which causes muscular spasm when the cortex is stimulated does not pass down the pyramidal tracts, but traverses certain other fibres, which he calls the "extra-pyramidal tract."

understand the method of production of these explosions in purely idiopathic cases of epilepsy.

Of one thing there can be no doubt, namely, that there must be a certain predisposition. The hereditary character of the disease is usually well marked. There is a lessened cortical stability in these cases, and in the family history of an epileptic there will usually be found individuals who have suffered from that disease, or from insanity, from alcoholism, or from some of the other disorders which specially characterise neurotic families. I cannot tell you whether consanguinity on the part of the parents is of itself a cause of such cortical weakness, but it is certain that if the family from which both parents spring has had epileptics among its numbers, such a consanguineous marriage would be exceedingly likely to be followed by epilepsy in the children.

As I have already pointed out,[1] the upper motor neuron is late in development, is highly specialised, is delicate, and is very susceptible of injury. It is probably on this account that this neuron so often shows traces of the severe strain which falls on the tissues generally at the time of puberty, especially in the case of the female. A large proportion of the instances of epilepsy one meets with arise at this period of life, a fact which has an important bearing, as we shall see later, on the prophylaxis of the disease.

But predisposition and the lessening of cortical stability is not of itself enough to account for the onset of epilepsy. There must also be an exciting cause. A sudden fright or other strong mental emotion or impression, may start off a series of explosive cortical discharges, and lead to a life-long epilepsy. Peripheral irritation may also occasionally, but I think rarely, act as the exciting cause of the disease in those predisposed. The presence of tape-worm in the intestine, for example, may so act, and the reflex irritation of a scar on some part—it may be a distant part—of the body may exceptionally act as the starting point of the disease. In a certain proportion of cases the epileptic seizures are the direct sequence of convulsions from which the patient suffered in infancy, and in these instances the effect of rickets as a predisposing cause is very strong. It seems indeed as if the cortex, having once

[1] See the preceding lecture.

become accustomed to discharge in the violent fashion of epilepsy, did not readily lose that habit. There are many cases on record in which the epilepsy undoubtedly proceeded from some evident source of irritation, and in which the fits did not cease at once on the removal of that irritation, but persisted until the cortex had been quieted down by medical treatment.

Another potent cause of the production of epilepsy, and one which will I believe be more recognised and understood in the future, is the action of poisons on the cortex. Alcohol is typically one of these, and its misuse if persisted in for long is apt to be followed by epileptic attacks. In a few of these cases of alcoholic epilepsy,[1] occurring after middle age, the poison acts by reason of the arterio-sclerotic changes which it produces in the vessels of the brain, leading in this way to circulatory disturbance and deficient nutrition. Perhaps the cardiac changes which follow the abuse of alcohol may also assist in its production.[2] In this form of alcoholic epilepsy the fits do not disappear when the patient ceases to take the alcohol. Much more commonly, however, the alcohol acts purely as a toxine, causing thereby the cortical explosions of epilepsy, and this action is usually seen about the same period in the case as that at which symptoms of neuritis show themselves, or the signs of delirium tremens appear. This, the commonest form of alcoholic epilepsy, is usually readily cured by removal of the poison, the fits generally ceasing within a fortnight of the commencement of total abstinence.

Absinth is a cause of epilepsy even more potent than alcohol, but fortunately this dangerous nerve-poison has not yet invaded our country to any extent. Chronic lead-poisoning is another of those conditions by which the tendency to epilepsy in a predisposed brain may be excited.

Certain of the toxines of infective disease may also act in this way. Syphilis certainly does so sometimes, though in many syphilitic epileptics the fits are probably due to those arterial changes to which that disease so often gives rise. The

[1] See a paper by Bratz, "Alkohol und Epilepsie," *Allgem. Zeit. f. Psychiatrie*, 1899, p. 334.

[2] A. Smith, "Ueber eine . . . als 'Alkohologene cardiale Epilepsie' characterisirende Gruppe epileptoider Zustande," *Man. med. Woch.* Bd. 45 (1898), p. 1372.

toxine of the typhoid bacillus, as Friedländer has shown,[1] is a potent cause of epilepsy, and probably many other like toxines act in the same way. Eclampsia in childhood often arises in this fashion, and it seems probable that the fits of infancy not uncommonly translate themselves into the epilepsy of the adolescent and the adult.

But of all the causes of that form of epilepsy which we call idiopathic, the most common is auto-intoxication, in which the toxines which act on the predisposed cortex are certain bodies formed in the gastro-intestinal canal by reason of digestive disorders, or elsewhere in the body by faulty metabolism. What these substances are we do not know exactly, though something is known as to their solubility in various media and experimentally as to their toxic power. The whole subject is a very obscure one, and I cannot discuss it fully here. Much work in this line has been done of late years, particularly in France and Italy, towards its elucidation. It is not possible at present to arrive at any very definite conclusion, beyond the general one that such poisons are formed within the gastro-intestinal canal, that they are absorbed into the blood, and that they in that way reach the cortex. Before the fit occurs the nitrogenous elimination is decreased,[2] as well as that of the chlorides and P_2O_5, while after the fit is over all the waste substances of metabolism are increased. When the toxicity of the urine and of the blood is tested by injecting them into animals, their poisonous quality is found to be considerably increased after a fit. There is also evidence, in the increased excretion of etherial sulphates, that just before a fit comes on in many cases of epilepsy there is an increased amount of putrifactive change in the stomach and intestines.

Before considering the treatment of idiopathic epilepsy, a word may be said as to prophylaxis as applied to the children of an epileptic parent, such of them at least as show signs of a neurotic inheritance. In a former lecture I have indicated the general lines on which such a child should be brought up, and

[1] Friedländer, "Ueber den Einfluss des Typhus abdominalis auf das Centralnervensystem," *Monatsschr. f. Psych. und Neur.* 1900, p. 333.

[2] Froehner and Hoppe, "Der Stoffwechsel von Epileptikern unter dem Einfluss der Schilddrüsenfütterung," *Psych. Woch.* 1899, p. 313.

little remains to be added. If a child of epileptic parentage has inherited a tendence to that disease he will probably show signs of such in the shape of convulsions when any considerable temporary irritation occurs—in teething, for example, or in some febrile complaint. In these circumstances very special attention should be paid to the rearing of the child. He should be much in the open air, have plenty of exercise, little brain work, plenty of sleep. His food should be ample, but plain and light, and it should include but little butcher meat. When the time of puberty arrives, special care should be taken to avoid brain fatigue.

The treatment of a patient suffering from idiopathic epilepsy is one which demands great care and patience. In the case of adults it is well, when the diagnosis has been made, to inform the patient frankly that even under the most favourable circumstances he must remain under medical observation and control for some years, that he will have to exercise considerable self-denial in following rigorously the rules laid down for him, but that the disease need not materially affect his work, nor need it take from him many of the pleasures of life.

The diet of an epileptic should be light and easily digestible. Its composition must, of course, vary somewhat according to the individuality of each patient. But on the whole it should consist largely of milk, farinaceous food and vegetables, and should include but little meat. The great object is to prevent digestive disturbance and auto-intoxication, which, as has been already said, may give rise to explosions of cortical energy. The chief meal should be taken in the middle of the day and the supper should be a light one. As a rule, no alcohol,[1] tea, coffee or tobacco should be made use of. The condition of the bowels must, of course, be attended to and no constipation allowed to occur. The patient should take as much exercise in the open air as may be possible without inducing undue fatigue.

[1] German writers strive hard to show that beer is rather helpful than harmful in these cases, and Bratz has recently stated (*Monatsschr. f. Psych.* 1901) that in the case of two hundred epileptics under his observation, two bottles of beer in the day had the effect rather of decreasing the number of fits than of increasing them. It is probably best, however, for an epileptic to be a total abstainer.

The mental work of an epileptic patient should be light, but in many cases the education of a young patient need not be materially interfered with, though it must of necessity be conducted at home. The occupation of an epileptic should clearly be one which would not expose him to special risk of traumatism during his fits.

When a severe case of epilepsy first comes under observation with a view to treatment, you may find it to be a good thing to confine the patient to bed for a month or more, supplying the need of exercise by means of a moderate massage. In this way you can keep him under a more careful observation than might otherwise be possible, and undoubtedly the rest and quietness of life in bed allows your treatment every chance of success.

In cases in which there is evidence, from examination of the urine, that the metabolism of the body is upset, and that nitrogenous elimination is being curtailed, it may be well to try the effects of thyroid feeding. In this way the nitrogenous excretion may be largely increased, and some cases are much improved by this form of treatment.

If you have reason to believe that putrifaction of food in the gastro-intestinal tract and consequent toxine poisoning, is the starting point of each fit (and the quantities of etherial sulphates in the urine will guide you in this matter), then clearly you will try by purgatives and enemata, and by washing out the stomach to get rid of these products. The administration of salol and of small doses of mercury may also help.

Cases which arise from the abuse of alcohol, from chronic lead-poisoning and from syphilitic infection must be treated in the manner already described as appropriate to these conditions. It need hardly be added that in cases in which the attacks proceed from the reflex irritation of intestinal parasites or other removable cause, due means should be taken to free the patient from such sources of irritation.

But by far the most important line of treatment in idiopathic epilepsy is that by means of the bromides. It seems probable that these act on the cerebral centres by replacing the chloride of sodium in which these tissues are normally bathed. Beyond this we know nothing as to the *modus operandi* of their action. That the action is a most powerful and

remarkable one, you must all have had opportunity of convincing yourselves.

The bromides of potassium, sodium and ammonium appear to be about equal in therapeutical value. If one were to indicate any preference it would perhaps be for the bromide of sodium. But some people prefer to give a mixture of the three salts. Of late the bromide of strontium has had some vogue, but it does not appear to possess any distinct advantage,[1] and it is considerably more expensive than the others.

It is usual in the case of adults to begin by administering forty-five grains in each twenty-four hours, and it is well to give this quantity in divided doses, three times a day. If this is not sufficient to stop the fits, the quantity administered should be increased gradually until the necessary dosage is ascertained. This is always a matter of experience in each individual case. But it is well to remember that if you do not attain the desired result with a daily quantity of 90 grains in the case of an adult (or 50 or 60 grains in a child of ten), little good is to be expected from raising the dose above these limits.

In most cases the epileptic attacks are more or less checked and in many they entirely disappear during bromide administration. In a small percentage a complete and permanent cure is effected. The bromide has, however, to be given for a long period, and the administration should be absolutely continuous, no intermissions being allowed to occur save in exceptional cases. And if a cure has, happily, been effected, the continuous use of the bromide should go on for at least two years after the last fit. It may then be gradually reduced and its use ultimately discontinued.

The disagreeable signs of bromism do not, as a rule, occur if the daily dose does not exceed 60 grains in adult cases, or 40 grains in the case of children. With quantities above this, however, such symptoms frequently arise. There is then a certain amount of mental torpor and bodily weakness, and the superficial reflexes become diminished and ultimately lost. It used to be held, indeed, that the disappearance of the palate and pharyngeal reflex was a sign of full bromide action. But

[1] J. G. Smith, "Note on twelve cases of epileptic insanity treated by means of bromide of strontium," *Lancet*, 1899, Aug. 12th.

it is now known that this reflex is not always present in normal people. Ziehen has therefore suggested that the corneal reflex should be employed as a measure of the saturation of the body with bromine. If that reflex fails in one or in both eyes, the bromide treatment should be stopped for the time, or its poisonous effect may be inhibited by the administration of chloride of sodium.

The digestion is apt to be disturbed and may be so up to the point of absolute loss of appetite and loathing of food. This is usually accompanied by marked fœtor of breath resulting from decomposition of the buccal contents. Such disturbance is best met by regulating the diet, by giving purgatives, and by administering such intestinal antiseptics as salol, salicylate of bismuth, or small doses of mercury.

Another most disagreeable symptom of bromism is the eruption of acne which is so often seen and which may in bad cases proceed to extensive infiltration and necrosis of the skin. This complication is best met by the administration of Fowler's Solution of Arsenic.

It has been said that some cases of idiopathic epilepsy do not improve under the influence of bromide treatment or do so only very temporarily. Have we any guide to help us in deciding which cases are likely to improve under such treatment and which are not.[1] There is, first of all, a class of case which occurs in comparatively young persons, in which the fits, while not distinguishable from those of true epilepsy, are accompanied by various paræsthesiæ and other sensory disturbances. These fits are apt to be associated with menstruation or other occasional irritation. Such cases are really hysterical. They derive no benefit from bromides—are indeed sometimes the worse of such treatment—but they at once improve under the moral regimen of an hospital or nursing home.

That form of the disease which is known as "late epilepsy," those cases, that is, in which the fits appear for the first time late in life, are not very amenable to bromide treatment. A small percentage do well, and these are probably the more purely functional cases. Bromides have little or no effect in

[1] A most thoughtful paper on this point has recently been published by Fürstner, "Ueber Behandlung der Epilepsie," *Archiv. f. Psych. und Nervenkr.* Bd. 33, S. 240.

those instances of late epilepsy which depend for their causation on arterio-sclerotic changes in the cerebral vessels.

Very recently an interesting modification of the bromide treatment has been suggested by Richet and Toulouse,[1] which seems likely to be of benefit. I have already told you that in acting on the grey matter of the central nervous system the bromide salt probably does so by displacing the chloride, and I have also alluded to the power of chloride of sodium in inhibiting the action of the bromide salt, and the usefulness of its administration if that action appears to be going too far. It is therefore not unlikely that the action of the bromide salt would be the more powerful the less chlorides were contained in the tissues. The point which Richet and Toulouse specially investigated is whether by largely diminishing the quantity of chlorides taken with food, a smaller dose of bromide would be adequate to arrest the fits. This being the theory they proceeded to test its practical value in the case of thirty epileptics who were placed upon a special diet poor in common salt. They then found that comparatively small doses of bromide (thirty grains a day) were sufficient to arrest the fits. And the special value of this interesting method of treatment is shown by the fact that when those persons returned to normal diet—the dose of bromide remaining the same—the fits at once returned. This method appears to be so well worthy of trial that I shall now give you the details of the diet Richet and Toulouse recommend. It is as follows:—

Milk	1000 grammes.
Meat	300 "
Potato	300 "
Flour	200 "
Two eggs	70 "
Sugar	50 "
Coffee	100 "
Butter	40 "

The quantity of chlorides, estimated as chloride of sodium, which this diet contains is about 2 grammes, contrasting with the 10 to 15 grammes which are found in ordinary diet. This

[1] Richet and Toulouse, "Effets d'une alimentation pauvre en chlorures sur le traitement de l'épilepsie par le bromure de sodium," *Comptes rendus de l'Académie des Sciences*, Nov. 20, 1899, p. 850.

restriction of chlorides does not seem as a general rule to produce any disagreeable effects, and if such were to occur it would be easy for you to add a little salt, say 3 to 5 grammes, to the diet, a quantity which would not materially interfere with the treatment. But you will readily understand that the bromide action has to be watched with great care in such cases.

The method of Flechsig in which he alternates courses of bromide with courses of opium is not one to be recommended.

Of late the use of one or two other bromide preparations has been suggested. The best of these is bromipin, which is prepared by adding bromine to sesame oil in the proportion of 10 per cent. One tablespoonful therefore contains 24 grains of bromine, which is chemically equal to 38 grains of potassium bromide, but is rather more powerful physiologically and therapeutically. The taste is oily and disagreeable to some patients. While it is said to be less liable to cause bromism than the alkaline salts, its chief advantage seems to be found in the case of these epileptics who refuse to take bromides. The bromipin may then be given in soup or in coffee without the knowledge of the patient, and some go as far as to administer the promipin under the name and in the guise of cod-liver oil.

Sometimes you will find that it is advisable to add other drugs to the bromide you are giving, so as to enhance its action. The addition of five minims of tincture of digitalis is recommended by Gowers, and this sometimes proves useful, as does also the combination of belladonna with the bromide. Bechterew[1] uses a combination of bromide with infusion of Adonis Vernalis.

The substitutes for bromides are of comparatively little service. Nitrate of silver used to be given years ago, before the bromide treatment was discovered, and I showed you the other day an old man whose bluish-black countenance depended on the argyria which such treatment brings on. Gowers recommends the use of bi-borate of sodium (5 to 10 grains) in cases unsuitable for bromide treatment, and oxide of zinc,

[1] Bechterew, "Ueber die Bedeutung des gleichzeitigen Gebrauchs der Bromide und der Adonis vernalis bei Epilepsie," *Neurol. Centralbl.* Bd. 13 (1894), S. 838. See also a paper by the same author, "Ueber die Bedeutung der Cardiaca bei der Behandlung der Epilepsie," in the above journal for 1898, p. 290.

an old anti-epileptic remedy, still occasionally proves of some service.

I have not hitherto spoken of the treatment of the attack itself. In very rare cases it may be possible by sudden stimulation to abort the convulsion. When, for example, the aura commences in one hand, the patient may prevent the full development of the attack by suddenly tightening a strap round the arm above the point at which the aura starts. I was able to show you a case of this kind lately. But once the attack really commences there is little to be done beyond loosening the clothing round the neck of the patient, preventing the tongue from being bitten, and if suffocation threatens, drawing the tongue forward. It is well to see that the post-epileptic sleep is undisturbed.

If, however, the patient passes into that series of convulsions which we know as the "Status Epilepticus" life is in great danger and every possible means should be used to stop the attack. The administration of chloroform or of ether is then indicated. Chloral or amylene hydrate should also be given, by the mouth if possible, or by the bowel, but if the patient, as often happens, cannot swallow and cannot retain enemata, then the amylene hydrade may be injected into the muscles. Nitrite of amyl or nitro-glycerine sometimes does good, and occasionally hypodermic injection of morphia may be required. In the "Status Epilepticus" this is a somewhat dangerous proceeding, and therefore the dose of morphia should be small, not more than one-twelfth of a grain. If hyperpyrexia threatens, the use of the cold pack or of a cold bath is indicated.

In a grave case where death is threatening from the long series of convulsions in the status epilepticus it may fairly be considered whether an intra-dural injection of cocaine might not be tried. According to Jacob,[1] medicines which are introduced into the spinal dura are diffused by the cerebro-spinal fluid, and he believes that they are in this way conveyed to the brain. Whether this is so or not can only be determined by observation, and I am not aware that any attempt to determine it has been made on the human subject, although it is a matter

[1] Jacob, "Klinische und experimentelle Erfahrungen über die Duralinfusion," *Presse. méd. Wien.* 1900, p. 46.

of common knowledge that injections of cocaine can safely be made into the spinal meninges by Bier's method. We know from the experiments of Prus[1] that in animals the painting of a solution of cocaine over the motor cortex prevents the convulsions to which faradic stimulation would otherwise give rise. In a case of dangerous infantile convulsions it might perhaps be permissible to inject cocaine in a weak solution through the fontanelle. In a case of the status epilepticus which appeared about to end fatally, might it not be justifiable to make a small trephine opening over the cortex and inject the cocaine solution directly.

Passing now to the operative treatment of epilepsy, it may be said in the first place that in those rare cases in which a neuroma or an old cicatrix is the starting point of the aura or evidently the reflex cause of the attack, the removal of this peripheral irritation is clearly indicated.

In cases of pure idiopathic epilepsy surgical treatment is of little avail; indeed it is somewhat amusing, if a little sad, to contemplate the various forms of operation which surgeons have from time to time devised and carried out for the cure of epilepsy. They have performed tracheotomy in the hope of effecting a cure; they have ligatured the carotids or the vertebral vessels; they have extirpated the superior cervical ganglia of the sympathetic; they have performed the rite of circumcision; they have castrated people whose testicles were not diseased; they have excised the clittoris, and removed healthy ovaries; indeed they seem to have left nothing undone, save the cure of the disease for which these ingenious and interesting operations were undertaken.[2]

There is something, however, to be said for trephining in such cases. With the safe surgery of these days, this operation is performed with a minimum of danger, and it has been tried many times for the relief of idiopathic epilepsy. It sometimes succeeds in arresting the fits for a time, as indeed the counter-irritation of any major operation may do,[3] but it is but very rarely that a permanent cure results. I can, however,

[1] Prus, *loc. cit.*

[2] See *inter alia* von Bergmann, "Die chirurgische Behandlung von Hirnkrankheiten," 3te auflage, Berlin 1899, S. 389.

[3] See a paper by J. Maclaren, "Cases illustrating effect of Peripheral Irritations in Epilepsy," *Ed. Med. Journal*, vol. xx. (1875), p. 618.

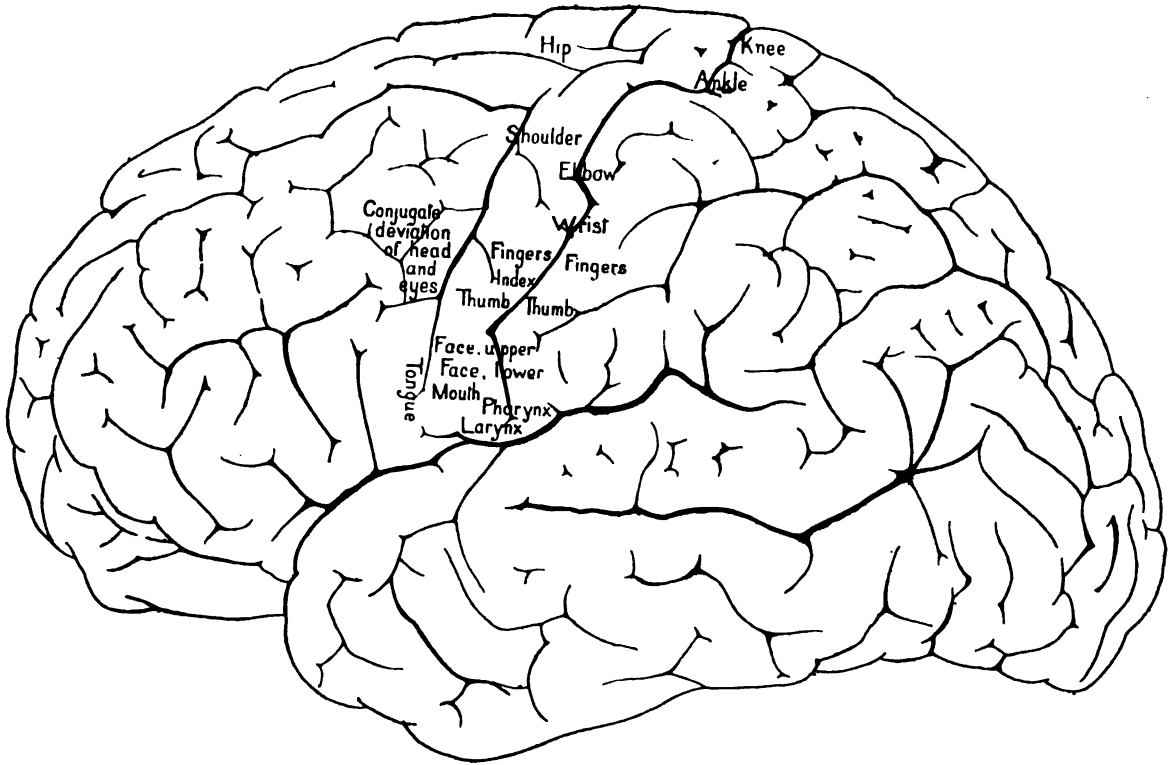
recall one case of this kind in which trephining was successful. Nevertheless in idiopathic cases the operation can only be considered as a *dernier resort.*

We pass now from idiopathic epilepsy to consider the symptomatic form, that is, those cases in which complete or partial epileptic seizures occur as the result of distinct and localised pathological changes in the cranial bones or within the cranial cavity. Many of these cases result from non-purulent encephalitis and the other causes—pre-natal, natal or post-natal—of infantile cerebral paralysis, from tumours involving the cortex, from localised thrombosis, etc., or from the many traumatic causes from which cortical irritation may spring.

These cases of symptomatic epilepsy stand in marked contrast as regards treatment to the idiopathic cases we have been considering. In the latter bromide treatment is very fairly successful, while operative measures are of little avail. In symptomatic cases the exact opposite is the case. Bromides do not produce, as a rule, any lasting effect on the fits, while operative measures are often successful. Certainly bromide treatment should be tried, but I fear that you will find the action of these salts very uncertain. Sometimes the fits may be diminished in number and severity at first, and they may even be arrested for a time, but even while the bromide is still being taken they are apt to return and they may then show considerable and increased severity. If this occurs you will probably find that it is quite useless to increase the dose of the bromide beyond, say 90 grains taken during each day.

In the traumatic cases where there is reason to suspect depression of the bone, splintering of the inner table, blood-clot, etc., and in those in which the convulsions in their Jacksonian character point to the presence of a tumour, a cyst or a removable scar, the operation of trephining is indicated.

These fits of cortical or Jacksonian epilepsy are very characteristic and of a high value in respect of diagnosis, and not less so in respect of treatment, especially in cases of tumour. The spasm usually begins in some special group of muscles, or even in one particular muscle, and subsequently, from radiation of irritation over the cortex to neighbouring centres, other



APPROXIMATE POSITION OF MOTOR AREAS ON LEFT CORTEX—*after* DEJERINE.

muscle groups which these centres represent become involved in the convulsion. The exact way in which the spasm begins is indicative of the position of the cortical lesion and tells us where we should direct the surgeon to apply his trephine. If, for example, the spasm begins in the index finger and only extends subsequently to the other muscles of the limb, then the lesion may confidently be looked for over the centre for the index finger in the cortex on the opposite side of the body from that on which the spasm occurs. I give you a diagram showing the approximate position of these cortical motor centres.

In cases of trephining for traumatic epilepsy it is surprising to find in what a small proportion of operations the results are lasting. The fits usually cease for a time, but are very apt to return after some months or in a year, necessitating a second operation which may or may not be successful. Braun [1] records a case in point, one of traumatic epilepsy, in which he had to operate three times, and only achieved permanent success on the third occasion, when he removed the cortical centre for the left arm, the spasm having always begun in the muscles of that limb. At the time the case was published the patient had remained free from fits for six years, so that the cure may be conceived to have been a permanent one.

In young children the upper motor neuron is much more sensitive to irritation than is the case in the adult. This is probably due, as Oppenheim suggests, to insufficient development of the mechanism of inhibition. Convulsions are therefore very common in childhood. In their phenomena these fits closely resemble the epileptic attacks of adults, but they have a much greater tendency to appear in series. Sometimes, of course, the fits of childhood are really the commencement of a true epilepsy, but more usually they depend on some more or less temporary cause, and when that cause is removed and the series of fits has ceased, the matter is at an end. By this I mean that the nervous system of the child will not, as a rule, be injuriously affected, nor will its stability be impaired in the future by reason of these infantile convulsions.

It seems certain that in the case of these convulsions, as

[1] H. Braun, "Ueber die Erfolge der operativen Behandlung der traumatischen Jackson'schen Epilepsie," *Deutsche Zeitschr. f. kl. Chir.* Bd. 48, p. 223.

in ordinary epilepsy, there is always present some predisposition, some inherited weakness of the upper motor neuron, which renders it more easily irritated. Certainly you must all have observed that children vary greatly in this respect, some having fits on the slightest occasion, others with greater cause showing no such explosions of cortical energy.

But predisposition is not enough, there must also be an exciting cause; and, as in the epilepsy of adults, so in the eclampsia of childhood, that cause is usually some form of toxic action, some reflex irritation, or some organic brain mischief. The convulsions of childhood are common in the commencement of the various infective fevers, probably as the result of the action of the toxines of these maladies, but perhaps due directly to the increased temperature of the blood circulating in the cortex. Rickets has much to do with the causation of these fits in children, and this may be considered, with fair probability, to be the result of auto-intoxication from the altered metabolic conditions of that disease. It need hardly be added that the poison of the uræmic state may, in children as in adults, irritate the cortex, and so cause convulsions.

When the cortex of the child is in that state of excitability which predisposes to such fits, peripheral irritation of almost any kind may bring on a series of convulsions. The more common of these are such irritations as that of teething, of gastric or intestinal catarrh, of the presence of intestinal worms, and even that of over-loading the stomach with food may on occasion give rise to a fit.

Various organic diseases of the brain or of its coverings may in children, as in adults, occasion epileptiform convulsions.

When you come to consider the treatment of fits in children there is at once apparent a distinct difference as contrasted with the treatment of convulsions in the adult. In the latter no treatment is necessary or useful during the fit, except in the rare cases of the Status Epilepticus. In the convulsions of children, on the other hand, it is possible and advisable to cut short the attack. This may be done by placing the child in a warm bath, and if this does not suffice, by administering chloroform. The inhalation of this drug is a perfectly safe procedure in the case of a child, if carefully carried out. The

irritability of the cortex may also be quieted by giving the child bromide of sodium, by the mouth if possible, if not, by the rectum. Chloral hydrate is also a most useful drug in these cases. It may be administered by the rectum in doses of five grains for a child of six months old, and of ten grains to a child of a year.[1]

At the same time it is necessary to get rid of any sources of peripheral irritation, and as these usually lie in the gastro-intestinal tract it is well to give an emetic and an enema.

After the series of fits is over it is advisable to give a little bromide for a day or two. Any evidence of the presence of rickets would suggest that the diet and general management of the child required re-adjusting.

Of tetany it may be said, with a near approach to certainty, that the phenomena which are characteristic of the disease are of toxic origin. Probably several forms of poison (toxines of infectious disease and of auto-intoxication) may so act as to produce the disease. Many considerations go to support this view. The disease sometimes occurs in epidemics, and when it is endemic it is seen much more frequently at some periods of the year than at others. It is also at times closely associated as a complication or sequæla, with such diseases as measles and influenza. Curiously enough, shoemakers are specially liable to suffer from tetany, and possibly this may be due, as Oppenheim suggests, to exposure to some poison contained in the leather with which they work. That tetany occasionally arises from auto-intoxication is, I think, evident from the fact that it so often occurs in persons suffering from dilatation of the stomach; and that it has some curious relation to the function of the thyroid is evinced by the fact that tetany often follows the total extirpation of that gland, though it does not result from the operation if part of the thyroid be left.

The tetany of children is closely associated in many instances with rickets and in others with gastro-intestinal catarrh, and probably in both cases it is to be regarded as the result of auto-intoxication.

But while, from the above facts, it seems clear that we

[1] See John Thomson, "Guide to the clinical examination and treatment of sick children," Edinburgh, 1898, p. 136.

must look for the cause of tetany in some form of toxic action, there is no clear or decisive evidence to show upon what set of neurons the poison acts. I cannot therefore say with any certainty that tetany is a disease of the upper motor neuron, and the treatment of the disease is considered in this lecture only as a matter of convenience.

The treatment of tetany resolves itself in the first instance into an attempt to remove the cause. Any gastro-intestinal catarrh, or other similar condition likely to give rise to poisoning, should be carefully treated, and suitable antiseptics given to prevent abnormal decomposition of the food. When the tetany has followed fever of any kind an endeavour may be made to eliminate the toxine through the skin by causing profuse sweating. Pilocarpine administered with this object has sometimes proved useful. The causal relation between removal of the thyroid and tetany, to which allusion has already been made, suggests the advisability of thyroid feeding, and this has proved successful in some cases, though not uniformly so.

The spasm may be allayed by the use of bromides, of chloral, of morphia, of hyoscine, and Hoche reports a favourable result from the employment of minute doses of curarine.[1] In the tetany of children the diet should be carefully regulated and any gastric or intestinal catarrh treated. In addition, the administration of phosphorus, iron and cod-liver oil is called for.

In speaking of chorea I do not refer to the post-hemiplegic form, the treatment of which is that of the hemiplegia which it has followed; nor to Huntingdon's chorea, the treatment of which is purely symptomatic; but to the ordinary form, chorea minor, or Sydenham's chorea, popularly known as St Vitus' Dance.

In common with so many of the diseases we have been considering chorea attacks those who inherit a predisposition to neuroses, and it appears chiefly in childhood and early youth; at a time, that is, when the power of cerebral inhibition is not fully developed. Such predisposing conditions being present, various exciting causes may precipitate the attack. Over-pressure in brain work at school may unquestionably

[1] Hoche, "Versuche mit Curarin bei Tetanie," *Neurolog. Centralblatt.* 1894.

start the attack, and the punishment which an ignorant schoolmaster sometimes inflicts on a boy fidgeting in the early stage of chorea may convert a mild into a very severe attack. Fright or other strong mental emotion may be the apparent starting point of the disease. Pregnancy is also one of its causes, and in regard to this matter there are two points to be borne in mind: first, that these attacks occur chiefly in young women in their first pregnancy; and second, that it is much more common in unmarried women, in whom there is generally some mental distress and depression, than in the married.

But while these and other similar conditions appear to precipitate the attack of chorea, there is, underlying it all, another cause, viz., toxic action. The virus which, in producing its effect on the nervous centres, gives rise to the phenomena of chorea, is probably, or perhaps one may say certainly, of different kinds. Occasionally, though rarely, the disease is seen as a consequence of scarlet-fever or of measles, but by far its most frequent and most interesting association is with acute rheumatism and acute endocarditis. That these affections are of microbic origin may now be regarded as established, and that it is to the toxines to which these diseases give rise that chorea is due, can hardly be doubted in those cases in which they are associated. One of the most interesting points in this connection is that there is good reason to believe that it is not the toxine of rheumatism itself which gives rise to the chorea, but rather some unknown substance which that toxine produces in its action on the tissues of the body. No anti-rheumatic treatment has the least effect on chorea. It may remind you of the relation between syphilis and locomotor ataxia in those cases (and they form the great majority) in which they stand in the relation of cause and effect. It is rare, indeed, that the most careful anti-syphilitic treatment has any effect on a case of locomotor ataxia.

Assuming, as we may fairly do, that such poisons, and probably also those of auto-intoxication, may give rise to chorea, there remains to be determined on what parts of the central nervous system these toxic influences act. There are no constant morbid appearances to be found in cases of chorea when examined after death, but we may feel pretty sure that the action is an irritative one on the upper motor neuron,

affecting, directly or indirectly, its cortical grey matter. We know, from the analogy of post-hemiplegic chorea that lesions of this neuron may occasion such symptoms. Monakow[1] argues, not to my mind very conclusively, that the lesion which gives rise to the chorea lies in the optic thalamus, and influences the upper motor neuron indirectly through centripedal fibres passing from the thalamus to the motor cortex.

In considering the treatment of chorea we cannot attempt to deal with the toxine, which, in many cases at all events, is its direct or indirect cause. We do not know what that toxine is, and, as has been said, even in those cases which appear to be most closely associated with rheumatism, anti-rheumatic treatment is without effect so far as the chorea is concerned. The future may bring us an anti-toxine, but at present we are not within sight of this result.

It has been said that mental excitement may determine an attack in those otherwise liable, and we know that in attacks arising from other causes such excitement greatly aggravates the symptoms. It is therefore apparent how essential it must be that a patient suffering from chorea should be placed under conditions of rest and quietude. The neuron is excited and irritable, and the rest should therefore be bodily as well as mental.

When the diagnosis has been made the child should be at once removed from school, and all lessons should cease. He should be placed in the charge of a sensible nurse, capable of amusing and interesting him, and he should be carefully isolated from his young companions. These, by noticing and calling his attention to his grimaces and odd movements, and commenting unfavourably on them, may do great harm to the nervous and quivering child. In many cases it is advisable to send the patient for isolation to a hospital or nursing home, particularly when the surroundings of the child at home are not satisfactory.

Even in very mild cases it is best to keep the patient in bed for some days, indeed, the longer he stays there the better, if he does not become weary of bed and fretful. But it is often

[1] Monakow, "Gehirnpathologie" in Nothnagel's *Specielle Pathologie und Therapie*, Wien, 1897, Bd. 9, S. 330.

advisable to let a mild case be out of bed, for some hours at least, each day. The room he inhabits should be large and airy, and exposed as much as possible to sunshine.

But in cases which are at all severe, absolute confinement to bed should be insisted on. The child should lie on a soft mattress, or in bad cases on a water-bed, and the greatest care has to be taken to avoid the occurrence of bed-sores, using the precautions described in the last lecture. A patient, the subject of chorea, is specially liable to suffer from such sores, partly because the nutrition and resistance of the tissues are lowered, and partly as a result of the skin friction to which the constant jerkings give rise. In bad cases, also, the fæces and urine are apt to be passed in bed without due notice, and this increases the tendency to the formation of bed-sores.

When the muscular jerkings are so severe as to threaten danger of bodily injury from trauma, it is well to place the bedding on the floor, and to surround the child with pillows or mattresses placed upright, so as to prevent contusion.

In the very mild cases douching with cool water has sometimes a good effect. In all but the very severe, warm baths have a soothing influence and seem to afford relief. Electrical treatment does no good, and its use is not advisable.

The great remedy in chorea is arsenic, its value in many cases amounting to that of a specific. The nature of its action is not known, but it seems probable that it controls in some way the action or the formation of the toxine. Be that as it may, there can be no question but that it benefits the neuron and favourably affects the progress of the case. It is usual to commence with a small dose of Fowler's Solution, say three drops, and to increase the quantity gradually up to eight or ten drops in the case of young children, and fifteen in older children and adults. This dose should be given three times a day after food, the physician watching carefully for any sign of arsenical poisoning. In some cases where, from gastro-intestinal irritation, the drug cannot be borne when administered by the mouth, it may have to be given hypodermically.

There are no good substitutes for arsenic in the treatment of chorea. Nitrate of silver, oxide of zinc, sulphate of copper, which have sometimes been employed, are not to be recommended. In the hands of some, large doses of quinine have

proved useful, but I have no experience of this method of treatment.

Various sedatives may have to be given in severe cases to control the jerking and to induce sleep. Of these bromide is of little service in cases of chorea. Antipyrine does better and is well borne even by young children. But the most useful sedative is chloral. Its employment is not necessary in mild or even in moderately severe cases, but when the jerkings are so pronounced as sensibly to exhaust the patient, and particularly when sleep is much interfered with, the use of chloral is called for, and it then usually does well. The drug requires to be given continuously, and a careful watch should be kept on the state of the heart during its administration. The use of morphia is not to be recommended save in very severe cases in which chloral given alone has failed. The combination of a small dose of morphia with the chloral may then succeed in procuring rest.

During the course of the treatment the administration of tonics may be advisable. When the gastric functions are in good order, cod-liver oil should be given, and when there is anæmia it is well to combine some preparation of iron with the arsenic.

In the stage of convalescence the power of control of the upper motor neuron over the muscles may be restored more quickly by means of regulated gymnastic exercises similar to those employed in locomotor ataxia for the re-education of the centres concerned in such movements.

In cases of the chorea of pregnancy, when the condition is severe, the induction of premature labour may be advisable.

ECLAMPSIA AND THE THYROID GLAND

A Preliminary Communication

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SUMMARY.

1. The changes in the blood and circulation in pregnancy.

2. The toxæmia of pregnancy and its bearing upon eclampsia and coincident anuria.

3. The state and functions of the thyroid gland in pregnancy.

4. A case of eclampsia treated by extract of thyroid gland.

5. The relation of the thyroid gland to eclampsia as seen in its bearing upon the pre-eclamptic symptoms of—

(*a*) Œdema.
(*b*) Albuminuria.
(*c*) Diminution of urine.
(*d*) High arterial tension.
(*e*) Headache, diarrhœa, eye conditions, etc.

6. The evidence that defective action of the thyroid may and does produce these symptoms culminating in eclampsia, including—

(*a*) The action of iodothyrin.
(*b*) The diuretic effect of thyroid juice.
(*c*) Its antagonistic action to supra-renal extract.
(*d*) Its influence over urea production.
(*e*) Its effect on the liver.

7. The treatment of eclampsia and the pre-eclamptic state by thyroid extract.

BEFORE discussing the relationship that may exist between thyroid function and the eclamptic state, we may shortly describe the changes which occur in the blood and circulation on the supervention of pregnancy.

The Changes in the Blood and Circulation in Pregnancy.

Profound changes occur in the quantity and quality of the blood in response to the altered conditions incident to pregnancy. There is an increase in the volume of the blood with a deficiency of the solid constituents of the serum, leading to a lower specific gravity. A more detailed examination shows that the red corpuscles and albumen are relatively diminished, while the number of white corpuscles is increased.[1]

There is also a relatively greater amount of water and of fibrin in the blood. These changes are admirably adapted to

[1] This is one of the first blood changes which follow thyroidectomy. It is not impossible that some degree of thyroid inadequacy may be a factor in producing this modification of the blood in pregnancy.

fulfil the requirements of the circulation at this time, for the vascular area through which the blood has to be pumped is now greatly increased, and the ventricle will accomplish its work more easily with diluted blood.

But the changes in the blood of the pregnant woman which concern us most are of a different nature. There is always a *toxæmia* as a result of the fœtal metabolism. The maternal blood being in close proximity to the fœtal blood, must undergo considerable alterations—excrementitious materials from the fœtus must be taken up, while on the other hand, it will lose certain of its constituents which the fœtus is capable of picking out and storing up in its body. As pregnancy advances the maternal blood will suffer to a greater extent as the amount of fœtal excretion will be larger. There is the possibility also, that certain diseases of the fœtus itself may tend to augment the toxic output into the maternal blood. Therefore towards the end of gestation, when the toxæmia is most pronounced, the margin of safety to the mother is greatly contracted. Unsuitable diet—chiefly of the proteid class,[1] a sudden chill, and a variety of other circumstances, may be sufficient to derange a mechanism now taxed to its utmost, and precipitate the dreaded symptoms of eclampsia.

Coincident with the blood changes of pregnancy there is a hypertrophy of the cardiac muscle and of the muscular coat of the blood-vessels giving rise to increased vascular tension. Until recently this hypertrophy was regarded as a natural sequel to the increased quantity of blood in the circulation, and to the wider area through which it had to be driven. It was therefore believed to be of a compensatory nature, and to this circumstance the freedom from accidents during chloroform anæsthesia in labour has been ascribed by some. That there is seldom true compensation resulting from this hypertrophy is evident to anyone who has noted the condition of matters in the circulatory system on the supervention of pregnancy. If dyspnœa and palpitation on exertion existed previously these are now markedly accentuated, showing that the heart has less power of responding to a demand for increased work. This would seem to be the real test of compensation—not what a heart can do under ordinary circumstances, but what degree

[1] The thyroid has a most important function in modifying and destroying proteids.

of reserve power it possesses. Dr James Mackenzie (1) has drawn attention to this matter, and adduces several reasons—among others the not uncommon appearance of a venous pulse in the neck, during pregnancy, to show that the hypertrophy is in no sense compensatory for the conditions of the circulation existing at this time. Some observations which I have made with the sphygmograph on pregnant women in different postures, confirm this view. There is a more marked quickening of the pulse and a greater fall in blood pressure on assuming the upright position than one usually finds in the non-pregnant state.

Clifford Allbutt (2) has suggested that the increased blood pressure during pregnancy is dependent upon the toxic condition of the blood. I think it not unlikely that the hypertrophy of the heart and blood-vessels is due to the same cause. The subjects of chronic uræmia, and those who suffer from a certain form of paroxysmal dyspnœa which is associated with arterio-sclerosis, are examples of the continued irritative effects of toxins upon the blood-vessels. Dr William Russell (3) has shown that in these cases the thickening of the arterial tube is mainly due to an increase in its muscular coat, and to a fibrous hyperplasia of the intima.

The Toxæmia of Pregnancy and its Bearing upon Eclampsia and Coincident Anuria.

The toxic theory of eclampsia is now the one generally held by most obstetricians, and in this connection the following points may be mentioned :—

1. That in every case of pregnancy more or less toxæmia exists, and that the blood intoxication becomes more profound towards the end of gestation.

2. That although the eclamptic state is due to a toxæmia, the toxic agent which excites the convulsions is probably not always the same—there seem to be different types of the disease.

3. That the toxins may be produced in greater abundance in some cases (twin pregnancies), and that they are generally more virulent in primiparæ than in multiparæ. In the primipara mechanical pressure on the renal vessels may possibly

come more into play, while in the multipara a certain degree of immunity against the toxin may have been acquired from previous pregnancies (Allbutt).

4. That in spite of very grave toxæmia no alarming symptoms will occur so long as elimination by the kidneys is sufficiently active.

Of the nature of the toxins we know nothing, and there is no clear evidence to show where they are formed. There is some reason to believe that the fœtus plays an important part in their production, because after its death the various symptoms usually abate. If the fœtus contribute a part of the poison, then it is unlikely that we can exert any control over its formation, so our efforts in the avoidance of eclampsia may be more usefully directed towards the maintenance of efficient renal function.

A checking of elimination by the kidney, more or less suddenly produced, will result in the development of all the symptoms of eclampsia.

Therefore the whole question of treatment, prophylactic and otherwise, turns upon elucidating the cause of this renal arrest. What is it that, during the course of the normal elimination of the toxins, suddenly throws the kidney out of gear?

It is my object to bring forward some evidence to show that, in certain cases of eclampsia, there is an intimate relationship between inadequate function of the thyroid gland (diminished supply of iodothyrin) and the mechanism which arrests the renal secretion.

The State and Functions of the Thyroid Gland[1] *in Pregnancy.*

Last September, Dr Ballantyne in talking with me about the normal enlargement of the thyroid gland in pregnancy, mentioned some very suggestive points from a paper by Lange (4).

This author noted twenty-five pregnancies in which the usual hypertrophy of the thyroid did not occur. In twenty of these there was albuminuria.

Large doses of thyroidin were administered to pregnant women in whom the physiological enlargement of the gland

[1] Under the thyroid gland it is to be understood that the parathyroids are included.

had occurred. A marked diminution in the size of the gland resulted.

One may therefore conclude that the normal hypertrophy of the thyroid gland in pregnancy is the result of a demand for extra secretion to meet the wants of increased metabolism. With a continuous supply of artificial secretion the gland is relieved of the additional strain, and resumes its former size. Hallion (5) observed similar effects, and Murray (6) has, on this hypothesis, used thyroid extract in certain cases of goitre with marked success. Lange also gave thyroidin to a case where there was a pathological enlargement of the thyroid gland during pregnancy. A diminution in size again resulted. He states that the exhibition of large doses of thyroidin to the mother are not contra-indicated, and that no atrophying effects on the fœtus are noticed.

One other point in Lange's monograph is worth mentioning here, as it has some bearing upon the subject of this paper. He used iodothyrin in patients suffering from the nephritis of pregnancy, and found that it had a distinct diuretic effect. It did not greatly diminish the albuminuria.

It occurred to me while meditating upon these statements, that there may be a possible connection between puerperal eclampsia and the thyroid gland. At this time I could not even frame a theory to suggest how the gland participated. A series of observations made with the sphygmograph on five cases of eclampsia, and some others taken in cases of myxœdema and cretinism—in the latter before and after thyroid treatment, afforded some matter for reflection. I decided that I would supply my next eclamptic patient with some artificial thyroid secretion.

At the end of September last I had the opportunity of doing so through the kindness of Dr Elmslie Henderson of Kirkcaldy. Before I proceed to discuss fully what I believe to be the probable rationale of this mode of treatment, I shall give a short account of the case which Dr Henderson has sent me.

Case of Puerperal Eclampsia treated by Thyroid Extract.

Mrs L——, æt. 32, in August 1900, engaged me to attend her in her third confinement. She was then five months

pregnant. She volunteered the following information:—Her first child was born six years ago. She stated that her face, hands and feet were much swollen before the child was born, and that on a Wednesday night she complained of severe headache, giddiness, blindness, and sickness with vomiting, after which she remembered nothing until the following Sunday. Her child was born on the Saturday night. She believes she had "convulsion fits." The child was dead.

When engaging her medical attendant for her next confinement, he elicited this history, and forthwith put her on a restricted diet, and, when symptoms of eclampsia began to appear, administered chloral and bromide. She suffered from eclamptic seizures at this, her second confinement, but to a less degree than at her first. Her second child was born alive. At the time I first saw her (August 1900), she was in good health, an active, intelligent and robust person. The urine was normal. I advised her to abstain from butcher meat. I saw her from time to time, when towards the end of September she complained of being drowsy and "feckless" in her domestic duties, of frontal headache, of giddiness and dimness of eyesight. Her whole body and face were œdematous and puffy. The urine contained albumen. I advised her to keep her bed, put her on a milk diet, and gave her a simple diuretic mixture.

Matters continued in this state until October 3rd, when I was hastily summoned to her, as she had had a "fit," was "queer kind," and unable to recognise her friends. I found her in a semi-unconscious condition, gazing fixedly into space. She appeared to me as ready at any moment to have another eclamptic seizure. I administered chloral and bromidia by the rectum, after which she fell into a sound sleep. There were no signs of commencing labour.

It so happened that on the same day, while discussing this case with Dr Nicholson of Edinburgh, he suggested the use of thyroid extract. Being impressed with his rationale of this treatment, I decided to give it a trial.

The same evening Mrs L. had regained consciousness, but still complained of severe headache, of drowsiness, and of dimness of vision. Her urine was very scanty, and was solid with albumen on boiling. Sphygmographic tracings were taken

from both radial arteries with great difficulty, owing to the swollen condition of the wrists. They indicated a contracted vessel and a pulse of high tension.

On October 4th the thyroid treatment was commenced, the dose being a 5 grain tabloid (B.W. and co.) twice daily. All other medication was stopped. The milk diet was still adhered to. In three days' time she was having three such tabloids daily. On October 10th improvement became noticeable. Her headaches were less severe and her eyesight not so blurred. The swelling of the face and body was much reduced, the quantity of urine had increased, while the albumen was diminished in amount. Other articles of food in addition to milk were now allowed.

On October 19th the improvement was more evident. She said she felt herself again, and besought me to let her get up. The urine was still further increased in amount, and contained much less albumen. The œdema of the face had greatly diminished, and the arms felt softer.

On October 25th she was able to engage in her household work. She still complained of headaches occasionally, but the giddiness had disappeared, and her vision was nearly normal again. She seemed physically, and especially mentally, more alert. The urine was normal in quantity, and contained no albumen.

The improvement was maintained. On November 6th she gave birth to a full-sized, living male infant, this achievement being accomplished without a single untoward symptom. She made a rapid and uneventful recovery, and now enjoys good health.

The thyroid extract was continued until ten days after her confinement. The albuminuria never returned.

Here is a patient who exhibited all the symptoms of the pre-eclamptic stage, and who had at least one typical fit nearly five weeks before the commencement of labour. The alarming symptoms subsided entirely, and she was delivered normally at full time of a living child. It might be argued that this was a mild type of the disease, where rapid recovery would occur without any treatment. This is certainly not the usual course of events, however, when the child remains *in utero*, and one

does not expect the œdema and albuminuria to steadily disappear when matters have proceeded so far as to produce a convulsion.

At any rate the gratifying termination to symptoms of a very threatening character under this treatment, led me to investigate the subject more fully.

The Relation of the Thyroid Gland to Eclampsia as seen in its Bearing upon the Pre-eclamptic Symptoms.

In working out the relationship of thyroid gland to eclampsia some of the more prominent pre-eclamptic symptoms may be considered.

Œdema.—First with regard to *œdema.*

This is sometimes an early symptom, but it is not necessarily marked. It may come and go during the later months of pregnancy. But in some instances the œdema is a most striking feature, to which, I venture to think, sufficient attention has not been directed.

Many practitioners must have repeatedly observed the existence of extensive general œdema during pregnancy without a trace of albumen in the urine. It may be present in patients who go safely through their term of pregnancy. But I have been particularly impressed with the character of the œdema in certain cases—some of these developed convulsions and others did not.

The œdema was general, but was not of the kind seen in ordinary dropsy. It was of a much more solid character, and only pitted on firm and prolonged pressure. The subjects of this œdema appeared to have put on fat during pregnancy. The arms and hands were uniformly thicker, and the wedding ring was embedded in the swollen finger. The face and neck specially arrested attention. The whole physiognomy was profoundly altered, all traces of former beauty being obliterated. The face was chiefly swollen in the eyelids, nose and lips. The nose was ill-defined, the bridge broadened, and the alæ nasi greatly thickened—this was perhaps the most striking peculiarity observed. The swelling of the whole neck was very noticeable, and that of the arms was of such a solid character that one could with difficulty pinch up a fold of skin.

The extraordinary thickness of the abdominal wall from œdematous infiltration, noted in one of the eclampsia cases, led one to suppose that the uterine tumour was unusually large. But after delivery the contracted uterus could not be defined, and then the true nature of the swelling was appreciated. It is noteworthy that the usual abdominal striæ were entirely absent in this case.

I would suggest that œdema of this kind is really of a myxœdematous nature. If it be present to a marked extent some degree of thyroid inadequacy is probably indicated, but, in the absence of other abnormal symptoms, it may forebode no evil. Thus I am certain I have observed this type of œdema in cases of normal pregnancy, but there was no albumen, and, what was more important, no diminished quantity of urine.

Albuminuria.—Next with regard to *albuminuria* and its relation to the convulsions.

Allbutt's view that the toxæmia incident to pregnancy will account for the albuminuria from the earlier months onwards, is a very likely one. We may put it in this way. Sometimes the blood intoxication may only lead to increased arterial tension—this is probably the general rule. At other times, if the blood be unduly toxic, either from excessive production of the toxins or owing to their insufficient elimination by the kidney, then we may find the high tension co-existing with more or less albumen in the urine. Should the quantity of urine now markedly decrease, or become suddenly suppressed altogether, then the well-known pre-eclamptic symptoms will appear. Then the toxæmia may be said to cause not only high arterial pressure and albuminuria, but also the convulsions. Hence the occurrence of albuminuria in the later months of pregnancy indicates that the toxæmia is advancing to a dangerous point, but so long as free diuresis continues there will be sufficient elimination of the toxins to guard against serious results.

Scanty albuminous urine with high arterial tension means that the kidney is soon going to strike work.

Allbutt's explanation is that the kidneys find it increasingly difficult to eliminate the toxins and eventually fail in their task. Herman (7) criticises this view on the ground that it is

incompatible with the onset of eclampsia in a few hours in an apparently healthy subject, as it is also with the rapid disappearance of the symptoms when they have developed during pregnancy. Allbutt believes that the toxins are responsible for the cessation of kidney action by inducing a spasm of the renal arterioles, but does not advance any theory as to how it is brought about. He points, however, to an interesting analogy observed in the toxæmia of lead poisoning, where during the colicky stage there are evidences of general arterial constriction, and the secretion of urine is very much diminished. Many of the symptoms of chronic lead poisoning are remarkably similar to those of the pre-eclamptic state, and some of them are highly suggestive in relation to the question of thyroid inadequacy as I shall afterwards attempt to show.

Diminution of Urine.—The two most important things about the urine in the pre-eclamptic period are the small quantity and the diminished amount of urea contained in it. Albumen, as I have indicated, is merely a symptom of the toxæmia, and need cause no alarm unless the daily urinary secretion is greatly lessened.

Therefore I regard *a diminution in the quantity of urine* towards the end of pregnancy as a most important danger signal. Albumen and œdema are not always present.

High Arterial Tension.—The only other symptom which I have reason to believe may sometimes afford an earlier indication of danger is the *radial pulse tracing.* In one case of eclampsia, where I took tracings before marriage and during early pregnancy, the change in pulse form towards the end of the seventh month was so pronounced that I could not but regard it as a premonition. This tracing revealed an unaccountable increase in tension, and six weeks later convulsions commenced. The quantity of urine at this time was perhaps rather less than the average of health, but no albumen appeared till two days before the seizures.

The peculiar solid œdema of the body was present to an unusual extent.

The state of the arterial blood pressure in pregnancy seems to me of great importance, and much more than is generally realised may be learnt from its study, even by means of the sphygmograph. During the later months of pregnancy the

degree of vascular tension is often a gauge of the fitness of the kidney to continue its work of elimination; the higher the tension the less urine secreted as a rule, and the less capable the kidney to perform its duties. Thus excessively high tension, unless accompanied by very free diuresis, should warn one that the kidney is approaching the stage at which all secretion will be abolished. My tracings from eclampsia fully bear out the conclusions arrived at by Ballantyne (8), but the case referred to will be published shortly in full.

To lower the blood pressure in eclampsia is quite a rational procedure, and indeed this is precisely what all our most successful remedies accomplish.

Headache, Diarrhœa, Eye Conditions, etc.—As other symptoms pointing to an unsafe degree of toxæmia, I would mention *headache*, restlessness, epigastric pain, vomiting, and unaccustomed *diarrhœa*. The latter should perhaps always attract special attention when occurring towards the end of pregnancy in a person previously constipated. Hadden (9), in a paper on "Cases of œdema of obscure origin," which were probably of a myxœdematous nature, observed diarrhœa in all of them.[1] The dimness of sight and *amaurosis* are generally later symptoms, but I do not think that they are necessarily dependent upon albuminuria.

The eye condition is often the immediate precursor of convulsions, and is probably due to the retention in the blood of the toxins. It is a choroiditis of the same nature, I believe, as that described by Mr Henry Power in his most suggestive Bowman Lecture (10), as occurring sometimes in cases of sudden suppression of the menses, and in amenorrhœa.

I may mention another symptom which I noted in one patient during the pre-eclamptic state, and which did not, at the time, specially impress me. I refer to the frequent occurrence of involuntary twitching of the muscles, chiefly those of the arms and legs. Edmunds (11) states that if the thyroid and parathyroid glands of the dog be completely removed, probably the first symptom observed is a "fibrillar twitching of the muscles." These minor clonic movements precede the onset

[1] This kind of diarrhœa may be allied to that of menstrual toxæmia, and should be regarded as an attempt to eliminate the toxins. See Barnes, *Brit. Med. Jour.*, vol. ... 1884, p. 438.

of severe general convulsions. The appearance of this muscular twitching in dogs is associated with the absence of thyroid secretion. The occurrence of a similar condition in the pre-eclamptic state is suggestive, and may bear the same explanation. This symptom, I have little doubt, would be frequently recognised in these cases if carefully looked for.

I will now endeavour to show how the development of the principal symptoms of eclamptic state may be traced to inadequate thyroid function.

The Evidence that Defective Action of the Thyroid Gland may and does produce these Symptoms culminating in Eclampsia.

In this short paper I can only record a few facts which seem to point in this direction, and say little by way of explanation.

The action of iodothyrin. — It will be useful to briefly state some points regarding the action of the thyroid secretion on the normal body. Robert Hutchison (12) has studied the subject very fully in an admirable paper, and has summarised his views in a more recent communication (13). From his conclusions as to the effects of iodothyrin, the active principle of the gland, I select the following :—

1. That under its administration the metabolic processes of the body are greatly increased.

2. That bodily *waste* is thereby increased, and chiefly owing to the *destruction of proteid tissues.*

3. That one of the early and most striking results of thyroid administration is the *increased excretion of urea.*

4. That the thyroid gland probably has the power of intercepting and storing up in its substance the small quantities of *iodine* contained in the food. (Thus if *iodides* are administered to an animal its thyroid gland will be found to contain a larger proportion of *iodine* than usual.)

5. That in the iodothyrin *iodine* exists in a certain form of organic combination. While this element is probably essential for the elaboration of a thoroughly active secretion, still it is not to the iodine that the functions of the gland can be ascribed.

6. That iodothyrin must be manufactured *continuously*, and must be supplied in larger quantities in certain states of the body, *e.g.* pregnancy. Under such circumstances a physiological hypertrophy of the gland should occur.

The Diuretic Effect of Thyroid Juice.—There are some other observations I would like to add to those already stated. Hurry Fenwick (14), in a paper on "The diuretic effects of fresh thyroid juice," makes some extremely interesting and suggestive statements:—

1. That the state known as myxœdema may depend upon a perverted renal function.

2. That the thyroid juice possesses a distinct diuretic action in diseases of the kidney, although apparently it is negative in healthy persons.

3. That if ten minims of fresh juice from a sheep's thyroid with an equal amount of distilled water, be injected hypodermically, the urine increases in quantity during the next day or the day after, and in myxœdema cases increased diuresis may continue for two or three weeks.

Many observers have noted the diuretic effects of thyroidin, and the diminished secretion of urine in myxœdema and cretinism is well known.

The Antagonistic Action of Thyroid to Supra-renal Extract.

George Oliver and Schäfer (15) have shown that the internal secretion of the thyroid gland tends to lower the blood pressure and to dilate the arteries. On the other hand the internal secretion of the supra-renal glands tends to raise the vascular tension, and to greatly contract the arterioles. One may therefore assume that the balance between the two, results in a certain arterial tone. In various pathological states this balance may be greatly disturbed. Thus in cases of cretinism and myxœdema, where the thyroid secretion is much diminished, an abnormally high arterial tension exists, and there are other symptoms which indicate that the vessels are unduly contracted. In cases of Addison's disease, where there is presumably insufficient adrenal secretion, the opposite state of things is found;

the arterial pressure is excessively low, and the vessels are well dilated.

George Oliver (16), by means of his arteriometer, has shown that preparations of the thyroid gland possess a specific tendency to increase the calibre of the radial artery in the human subject. He has also shown that the supra-renal extract, taken by the mouth, produces a general diminution of the radial calibre (17). By the use of the sphygmograph and the Hill-Barnard sphygmometer in myxœdema and in Addison's disease, I have been able to confirm these statements. In cases of paroxysmal dyspnœa associated with evident arterial spasm, I have found that the arteriometer will indicate a diminished radial calibre during the attack. By intravenous injection, supra-renal extract would seem to act directly on the muscular tissue of the arterioles, and not indirectly through the vaso-motor centre. No agent known produces such an extraordinary rise in blood-pressure, and causes such intense constriction of the small arteries. Only direct stimulation of the vaso-motor centre can produce a like result. It is also most interesting that when this arterial constriction is fully developed, during the activity of the extract, even the strongest stimulation of the depressor nerve is powerless to relax the spasm. It is important, too, to note that a truly homœopathic dose of the active principle of the gland—$\frac{1}{8000}$ of a grain to an adult man—will produce distinct results on the arteries.

In normal conditions the supra-renal influence which tends to diminish the radial calibre seems to be counteracted by the thyroid influence which tends entirely in the opposite direction. One may therefore suppose that should the thyroid secretion become markedly diminished or arrested altogether, the supra-renal influence on the arterioles, including those of the kidney, will be very profound. In this manner an intense spasm of the renal arterioles would be produced, which would result in a cessation of the secretion of urine. Lantos believes the eclamptic condition to follow upon reflex irritation of the vaso-motor centre—presumably by the toxins. This sets up such an extreme degree of vaso-constriction that the blood supply to the kidney is virtually shut off, and anuria results. The late Angus Macdonald (18) held the same view. This arrest of urine is really the "fuse" which leads up to the explosion.

It seems to me most probable that it may be induced by an intense spasm of the renal arterioles, and that a stoppage in the supply of iodothyrin is largely responsible for this result. I do not think it is brought about through the vaso-motor centre—for the time being the supra-renal influence is unopposed.

In the toxæmia of lead poisoning this extensive constriction of the arteries is also produced, and the blood pressure is very high. A great diminution in the quantity of urine results, which may nearly approach entire suppression, and the daily excretion of urea is lessened. Lead undoubtedly disturbs the metabolism profoundly. But a most suggestive point mentioned by T. Oliver is, that in the worst cases, atrophy of the thyroid gland has occurred (19). It is probable, then, that its function has been impaired to some extent, and this would be indicated from the nature of many of the symptoms. Are such profound changes due to lead itself, or are the symptoms dependent on certain toxic materials produced by the presence of the metal in the tissues of the body, which lead to an impairment of thyroid function? In this relation we may mention endemic goitre and cretinism, because there is certainly some connection between these conditions and the presence of a toxic agent in the drinking water. In both, the thyroid gland is affected, and symptoms not unlike those already mentioned result. In cretinism other features are added.

The Influence of the Thyroid Gland over Urea Production.

But I do not think that the spasm of the renal arterioles is the sole factor in the causation of the eclamptic state. The quantity of urine secreted may be connected in some way with the amount of urea sent to the kidney. The thyroid gland, by its special action on nitrogenous tissues, and on proteid [illegible] directly, determine the amount of [illegible] in the body. Urea is the most powerful [illegible] with which we are acquainted. In all [illegible] the excretion of urea in the [illegible] and the quantity of urine is also diminished.

When thyroid function is inadequate, then, the normal destruction of proteids will not occur, less urea will be prepared, and the secretion of urine will become diminished. Thus the diminished secretion of urine in eclampsia may not depend entirely upon the spasm of the renal arterioles, but may result also from complex derangements following upon the failure of the thyroid gland to deal with the proteids. Here we may have a hint as to the reason why a large proteid meal towards the end of pregnancy, may, under certain circumstances, induce eclamptic symptoms. The supply of iodothyrin in the organism at this time is not large, though it may be sufficient for the ordinary purposes of metabolism. If for some reason, however, the thyroid gland has not undergone adequate hypertrophy to meet the wants of the pregnant woman, and is suddenly called upon to deal with an excessive amount of nitrogenous food, then all its reserve secretion may be used up in the attempt to do so.

The Effect of Thyroid Inadequacy on the Liver.

Here again is to be found the possible explanation of the manner in which the liver participates in eclampsia. That it in many cases "strikes work" as well as the kidneys is almost certain, and in three cases of eclampsia I have seen marked jaundice. May not the liver suffer as a direct result of the thyroid inadequacy? Proteids, which should have been modified by the action of iodothyrin, come to it unchanged. It is not astonishing that the organ "gives in" when a new function is suddenly demanded in addition to the innumerable ones it already performs.

I would like to mention one other point which suggests that the thyroid gland may preside in some subtle manner over the functions of the renal protoplasm. I refer to the experiments of Bradford (20), who found that the removal of large quantities of the kidney substance in animals was followed by great emaciation, due to the rapid wasting of proteid tissues, chiefly the muscles, and also by the excretion of large quantities of urea. The quantity of urine was generally increased. This is simply a more extreme degree of what happens when thyroid extract is administered in large doses

as a so-called anti-fat. May not the extensive removal of kidney substance partially abolish one of the functions of the iodothyrin with the result that the surplus is utilised in exerting its full power on the proteid constituents of the body? Hence also the abnormal production of urea.

I have said enough to indicate that iodothyrin is a remarkable substance which is probably utilised in the metabolism of all the tissues of the body. It is not unlikely, therefore, that it should play a prominent part in the disturbed metabolic processes which belong to pregnancy.

Inadequate supply of iodothyrin towards the end of pregnancy may result in the anuria, which, by allowing the absorption of the toxins, leads up to the eclamptic symptoms. The cessation of kidney action is probably due partly to an intense constriction of the renal arterioles, and partly to impaired function of the thyroid gland with regard to its influence over urea formation, as already indicated. When there is insufficient iodothyrin to deal with the proteids introduced into the body, the liver is overburdened, and matters are further complicated. Iodothyrin may also exert a specific influence over the renal protoplasm, and may thus control the function of diuresis, but there is no definite proof of such an action.

The Treatment of Eclampsia and the Pre-eclamptic State by Thyroid Extract.

We now come to the important question of treatment.

Milne Murray has said "that for every strictly obstetrical complication, with the exception of eclampsia, we profess a remedy." With this statement we agree entirely, for our treatment is directed along well-established lines, and we know exactly what we wish to do. But in eclampsia we are groping in the dark. There are no principles of treatment we can adopt in all cases which we may reasonably expect will be followed by a successful result. If, as I have endeavoured to show, even some of these cases of eclampsia are associated with an inadequate supply of thyroid secretion, then our efforts at treatment will rest upon a sounder basis. The patient may be treated in the pre-albuminuric stage, in the pre-eclamptic stage, and even after the convulsions have commenced, with a fair

prospect of success. If patients could be induced to seek advice during their pregnancy the slighter premonitory symptoms might be recognised, and we would be forewarned of danger. It is very probable that the earliest indication comes from the pulse. If, towards the end of gestation it becomes abnormally slow and of high tension, there is good reason to examine for other symptoms. Almost invariably, I believe, will we elicit a history of diminished quantity of urine for several weeks before the appearance of the more definite pre-eclamptic symptoms. Small pathological enlargements of the thyroid gland should, I think, arouse suspicion. When present some degree of inadequate function may be inferred. I have personal knowledge of two such cases. In one albuminuria developed early in pregnancy, and was so persistent that premature labour was induced; in the other there was eclampsia at full term.

What is the treatment then in the early stages of the disease, where the quantity of urine seems to be less than the average of health, where the pulse tension is perhaps unduly high, but before albuminuria has appeared?

The thyroid extract may be given in 5 grain doses night and morning, and after a few days the same dose may be administered thrice daily. Proteid foods should be entirely forbidden at first, but with increasing secretion of urine, and improvement in other symptoms, they may be cautiously resumed.

The interesting question arises as to whether it is possible to indirectly augment or re-establish thyroid function, by supplying iodine to the patient in the form of iodide of potash. As has already been indicated, the iodine will be picked out of the blood by the gland, and may be elaborated into the active principle iodothyrin. In this connection it is noteworthy to find that iodide of potash, in small doses, has been regarded as a specific for puerperal albuminuria (21).

It is suggestive, too, that quite recently iodide of potassium infusions, instead of ordinary saline infusions, have been advocated in the treatment of eclampsia. Kocher (22) states that iodide of potash will cure some cases of goitre, but that there is a risk of iodine poisoning during the treatment.

But in giving thyroidin itself we are supplying iodine to the

thyroid gland. Thus in myxœdema, where there is impaired function of the gland, if we give thyroidin by the mouth, iodine appears in the urine. In the breaking up of this substance iodine is liberated, and there is no normally acting thyroid gland to absorb it, so it is got rid of. Therefore in giving thyroidin in eclampsia we probably obtain all the good effects of giving iodide of potash, and also other effects not produced by the latter drug.

When all the symptoms of eclampsia have appeared, and a fit seems imminent, or if convulsions have already occurred, then I do not think we can trust altogether to the use of thyroidin by the mouth. The action will not be rapid enough.

In such cases I would suggest the hypodermic injection of 10 or 15 minims of the liquor thyroidei, and this might be repeated every hour or two if not followed by signs of improvement. Or, better still, if we can obtain the fresh juice from a sheep's thyroid, and inject 10 minims of this with an equal quantity of distilled water. Experience will show whether these are adequate doses under such circumstances, for I can imagine that much larger quantities might be used with safety and perhaps with lasting benefit.

For the immediate treatment of the convulsion ***morphia*** is the remedy of all others, and should always be used if only for the reason that it will promptly inhibit the various processes of metabolism. By doing so there is the opportunity given to the thyroid gland to recover itself. Therefore the dose should be sufficiently large—not less than half a grain for the first injection. Eclamptic patients resist the dangerous effects of the drug in a remarkable way. Clarke of Oswego (23) has used as much as a grain and a half hypodermically, and Grace (24) reports cases where a grain was employed with uniformly good results. This extraordinary tolerance is difficult to explain, but we must remember that the medullary centres are undergoing abnormal stimulation from the toxic condition of the blood, and the arteries are firmly constricted. In other cases of general arterial spasm morphia is equally safe. Thus in acute peritonitic and other painful conditions, opium may be used with a very free hand.

Stephen Mackenzie (25) has used morphine hypodermically for the high tension and arterial spasm of chronic uræmia which

is set up by the abnormal contents of the vessels. Its great value, he says, is that "it relieves the blood-vessels from spasm." This is certainly what happens when we give a full hypodermic injection of morphia in eclampsia, and this is probably one of its most valuable effects in these cases. Even in cases of angina pectoris, when all the well-known vaso-dilators have been used, and have spent their power, we resort to morphia and obtain the desired result.

Morphine, then, dilates the arteries and reduces blood pressure perhaps more precisely and with more lasting effect, than any other remedy. Haig (26) makes some interesting suggestions as to the mode of action of morphia in puerperal convulsions. There is an "uric acid storm" at the end of pregnancy, he says, and morphia is beneficial by its effects on uric acid. I cannot now discuss his views, but they are well worth consideration in relation to defective thyroid function.

I may say, however, that I fully appreciate his rationale for the administration of salicylate of soda after the use of morphia, that is, during the time when uric acid is again being excreted. I would advocate the use of this drug, in large doses, in eclampsia after the completion of labour. Post-partum eclamptic seizures do not always seem to be of quite the same character as those which occur before and during labour. The use of morphia leads to a locking up of uric acid in the tissues, and this is followed by an excessive output into the blood current. May we not connect this circumstance with the occurrence of post-partum convulsions? In cases of eclampsia treated by morphia they are perhaps specially liable to develop.

The eclamptic seizures seem to be controlled to some extent by all remedies which tend to dilate the arteries. Drugs acting in an opposite way would seem to do harm, and Malcolm Black (27) reports a case where eclampsia was possibly induced by a tablespoonful dose of ergot.

Thyroidin, from its specific action in enlarging the radial calibre, may act by relieving spasm in the first instance. But we must recognise that in giving this drug we are also fulfil-ing other important indications, some of which we are not yet in a position to properly appreciate.

The treatment of eclampsia and of the pre-eclamptic state

by means of saline infusions is highly extolled by Jardine and others. The beneficial results following their use have been explained in various ways. I am sure that one of the early effects of giving such an infusion to an eclamptic patient is, to remove the arterial spasm and thus fulfil the first indication of rational treatment. Then, in the natural course of events, diuresis will follow. Any increase in the blood pressure caused by the infusion is of an exceedingly transient nature, for the calibre of the radial artery very soon indicates an enlargement, and there are evident signs of lower tension.

On this theory of eclampsia, then, it is possible by the combined use of thyroidin and morphine—

1. To fully and permanently relax arterial spasm.

2. To temporarily arrest general metabolism, and, in this way, tide the thyroid gland over a period during which it may recover its functions.

3. To supply artificial iodothyrin to counteract certain symptoms due to its deficiency in the blood and tissues.

4. To supply *iodine* for the elaboration of iodothyrin by the thyroid gland itself, and thus hasten its return to normal activity.

I have now recorded some facts in support of my contention that thyroid inadequacy plays an important part in the causation of some cases of eclampsia. I am fully conscious of having only touched the fringes of this most interesting subject. I have a firm conviction, however, that the thyroid gland does participate in a most important manner, not only in eclampsia but also in the production of many of the symptoms associated with pregnancy and menstruation.

Thus a woman has such symptoms as severe frontal headache, nausea, vomiting and diarrhœa at each of her menstrual periods. May not these symptoms afford a possible indication that during pregnancy her thyroid gland will be taxed to its utmost, and that she may become eclamptic? A physiological enlargement of the gland should occur during each menstruation. If it does not do so may we not have the counterpart of a pre-eclamptic period? Mere mention may be made of the vomiting of pregnancy and its relation sometimes to defective thyroid function. There is much to be said in favour of such a view.

Taking it for granted that there is an intimate relationship between eclampsia and the thyroid gland, it is by no means clear what it is. I am not aware that anything has been written on the subject, so I have brought forward, in this disconnected way, some evidence which I hope may be suggestive to others, and which may assist in the elucidation of this obscure connection.

Note.—I had recently another opportunity of noting the effects of thyroid treatment in a case of eclampsia under the care of Dr Ballantyne at the Edinburgh Maternity Hospital. The case, a severe one, had been treated by morphia, and post-partum seizures were occurring every few hours. In this patient the peculiar type of œdema, already described, was a most marked feature. She had no fits for 24 hours, but was still in a typically eclamptic state, when 5 grains of thyroid extract were given thrice daily. No more fits occurred, and the symptoms improved. The way in which the œdema subsided was extraordinary. Its extent was only properly realised when the remarkable alteration in the appearance of the patient was observed.

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Special Article

MR CARNEGIE AND EDUCATION IN SCOTLAND

THE people of Scotland were startled towards the middle of last month by the announcement that their fellow-countryman, Mr Carnegie, had hatched a scheme for establishing free University education in his native land.

The announcement was premature, and it was therefore incomplete, and perhaps in some respects misleading. We have therefore no intention of criticising any imaginary scheme. We have, however, reason to believe that Mr Carnegie has had in his mind for some time a great object, namely, to bring higher education, and even professional education, within the reach of such of the youth of Scotland as are at present debarred from either owing to financial inability. This is in itself a great conception, and we hold that Mr Carnegie is as much to be congratulated on it as the people who may benefit by it. To be both the parent of a great idea for the benefit of others, and to have the means of realising it is a privilege not given to many men.

We earnestly hope that Mr Carnegie may succeed in forming a scheme that will be worthy of a big idea, but it seems to us that to ensure this there are certain considerations to be kept in view, and it is our present purpose to indicate what we think some at least of these are.

We assume that the object aimed at is to provide the means by which youths of ability, and with enthusiasm, or well-marked desire for learning, shall be provided with the means of obtaining such learning irrespective of their monetary

position. It is presumed that there is no desire to force, or persuade, or even encourage youths to merely enroll themselves as students at one of our Universities. What is wanted is a scheme by which the really able and ambitious youth of the country can in the first place be discovered, and in the second place be provided with the means of pursuing their educational aspirations. If we are right in assuming this to be Mr Carnegie's fundamental idea, it cannot be too precisely stated and steadily kept in view.

With this as our premises we venture to think that we have already had experience in Scotland of how such an object can be realised, and we doubt not the present system could be greatly extended, without in any way revolutionising or dislocating our educational system.

In the past there was a very important gap in the educational ladder for youths from the provinces. In the provinces education in the schools was not carried as far as in the large towns or cities, with the result that lads from the provinces were placed at a great disadvantage when they desired a University education, and if they could only get it by securing an entrance bursary at one of the Universities. These bursaries usually fell to lads educated at grammar schools or other high-class schools. In some counties there were bursaries provided by local organisations which enabled one or two lads belonging to the particular county to enter at one of the Universities.

About some thirty years ago this aspect of education so impressed one of the ministers of the Free Church of Scotland that he originated a scheme for the benefit of Gaelic-speaking young men, by which the gap we have referred to was bridged. The scheme provided bursaries for enabling lads to go from their local schools to higher-class schools in the towns for one or two years, and the object was to put the lads in a position to compete on equal terms with town-bred lads for University bursaries. The lads were selected by competition, the competitions being held at convenient centres in the different Highland Presbyteries. Although the scheme was under the wing of the Free Church there was no attempt or desire to make the successful competitors think that they were expected to become ministers of the Church. This scheme is still carried on by its founder, the Rev. Dr J. Calder Macphail, and

we know from personal knowledge that it has been eminently useful and successful, and a great boon to scores of Gaelic-speaking lads. Many of these "Grammar School Bursars" now occupy important posts in the service of the Church and the country, and they attribute their success to this scheme.

Within more recent years, we understand, other schemes have been started and worked on Dr Macphail's model; but as we do not profess a complete knowledge of the educational machinery in the country we need not further refer to this.

The point which we seek to emphasise is that in this scheme there is a working model of a method which could be vastly extended and made of inestimable value to the youth of the country and therefore to the country itself.

This provides the intermediate stage. Entrance to the Universities is already provided for, on a limited scale, by entrance bursaries; but these could be greatly increased in number, and to make them applicable or available to the poorest, some, at least, of the bursaries should be large enough to provide sustenance, however frugal.

Bursaries need not be confined to Universities; they could also be made available for Technical Colleges and similar Institutions.

This brings us to the end of systematic University and College education; but we think it would be a mistake to dwarf a great scheme by stopping at the completion of an ordinary curriculum at any of our Universities. In a scheme of the kind contemplated by Mr Carnegie, it is to be borne in mind that the object is not alone the conferring of benefit upon individuals, not alone the educating of men to enable them to make a livelihood in a position in life in which special education is required. The further and greater object is the benefit accruing to the community from the services, and capacity for higher service, of a greater number of its members. This aspect of the scheme we hope will not be minimised. With a view to fully reaping the harvest which might be expected from a scheme of such magnitude, the best of the men who had completed their University career should be provided with Fellowships—Research and Travelling Fellowships—to enable them to pursue the line of work, in which their talents lie, to a still higher level. At this stage in their education,

men are so equipped that they can with advantage specialise. The specialisation can take many directions; in Science there are Chemistry, Physics, Biology; in Medicine there are again these three, and, in addition, Physiology, Pharmacology and Pathology. In all of these there are unlimited opportunities for research, but at present hardly anyone, who is not endowed with private means, can devote himself to them. This is the reason why Scotland lingers behind some other countries in the production of original work.

This to our mind completes the scheme from the standpoint of the individual. But the scheme would doubtless be enhanced still more in value if means were provided for establishing Research Professorships in connection with our Universities and Colleges. In these appointments men would not be hampered and overwhelmed with routine teaching and examination work as Professors appear to be at present; but would be given time and facilities for original work, which would again place Scotland in the forefront of things scientific.

WILLIAM RUSSELL.

Recent Literature

CRITICAL SUMMARIES AND ABSTRACTS

MEDICINE

THE PARASITE OF CANCER—FURTHER RESEARCHES

By WILLIAM RUSSELL, M.D., F.R.C.P.Ed.,
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IN 1898 the State of New York established in the University of Buffalo a laboratory for the investigation of cancer, and Dr Harvey R. Gaylord, the Director of the Laboratory, has just published the first paper of a series containing an account of three years' work on the subject (*The American Journal of the Medical Sciences*, May 1901). The paper opens with a detailed account of a case of colloid cancer of the abdomen, originating as an adeno-carcinoma, from which fluid had been taken during the life of the patient. This fluid was found to contain a large number of small hyaline bodies, which were observed to increase in size and change in form and pass through a cycle of development to what appeared to be a spore-forming stage. With this

fluid a dog and a guinea-pig were inoculated in the peritoneal cavity and a guinea-pig in the jugular. The two former developed peritonitis, with enlargement of lymph nodes, and the fluid in the abdominal cavity contained the characteristic spherical bodies, nucleated bodies, and sacs filled with granules, such as were present in the abdominal fluid originally removed from man. The animal injected in the jugular was killed after fifty days, and in its lungs were found minute white nodules which were found to be foci of adeno-carcinoma. At this time they had not been successful in growing this organism, but he soon overcame the difficulty, and thereafter succeeded in cultivating it with comparative regularity.

It is interesting to note that the small spherical bodies in the peritoneal fluid were at first thought to be fat.

Efforts were then directed to an investigation of the fresh scrapings of cancer and in attempting to demonstrate the bodies in the tissue in hardened sections. Various important observations were made at this stage; it was found that in rapidly growing tumours a great number of organisms were present, and that they increased in the tissues after the part had been removed, as in tumours, or after the death of the patient. The "cancer juice" consisted of a practically pure culture of the bodies.

They were "forced to conclude that bodies identical in appearance to those observed in the peritoneal fluid of the first case could be found in all scrapings of cancer." "The small highly refractive form which in suspension possesses a characteristic oscillating motion, the larger pale forms projecting pseudopodia, and the saccular forms containing highly refractive spherical bodies could be detected with equal facility in the fresh scrapings of any malignant tumour." By incubating hanging drops the smaller forms could be followed in their development, during which they grew in size and finally became granulated, and if kept upon a warm stage, ultimately threw out pseudopodia, developed a nucleus, anded end by turning into a sac containing the spores of the organism.

Having satisfied themselves that a large number of organisms were invariably present in cancer, they then undertook to determine why these organisms could not be demonstrated with the ordinary staining methods in the tissues, and they were able, first of all, to determine that the application of almost all fixatives caused the disappearance of all the spore sacs and the greater part of the large spherical and granular bodies. Only the small, more resistant forms of the organism remained, and these he identified as "Russell's fuchsin bodies." The larger forms, which were hyaline or contained fine granules stained by

the ordinary methods in sections, so closely resembled free nuclei and round cells that it was impossible to state which were parasites and which tissue elements.

This was the state of their work in January 1899, and it was briefly this,—they believed they had recognised and demonstrated the presence of parasites in cancer and had successfully produced cancer in one animal, but they were not in a position at that time to state what the nature of the parasite might be. With a view to determine this point an elaborate series of experiments was planned and carried out.

Some generalisations are made, which even to those of us who believe most firmly in the infectivity of cancer are somewhat startling; such, for instance, as that "*all the organs, including the blood taken from all regions of all cases dying of cancer, including sarcoma and epithelioma contain large numbers of the organisms*"; and further that "*in all cases of carcinoma and sarcoma thus far examined in which cachexia was well marked, that the organisms, especially the younger forms, can be detected in the peripheral blood.*" In these cases the organism possesses great virulence and animals may be infected by the peripheral blood or with cultures or carcinomatous material.

The question remained, was this organism a protozoon or a blastomyces? At this point he reviews the literature of the question in an eminently fair and impartial spirit. This need not be gone into in detail, especially as a summary of the work referred to appeared in this journal in September of last year. He especially refers to the work of Russell, Sanfelice, Busse and Plimmer. He then set himself to investigate several important questions; as, for instance, whether the bodies differentiated by Plimmer's method were present in all cancers; whether they could be regarded as the result of degenerations; were there grounds for regarding them as altered blastomycetes; and what were the relations between them and Russell's bodies and various cell inclusions which had been described. A large number of observations showed the existence of Plimmer's bodies and Russell's bodies. The cell inclusions differentiated by Plimmer's method could be readily differentiated from cell degenerations of the usual type. Gaylord recognises an intra- and an extra-cellular form of the parasite, and has traced a direct morphological relation between Russell's bodies (he evidently means the extra-cellular form, for Russell described both) and Plimmer's bodies. Gaylord classes the parasite as a protozoon—basing this upon the appearance of pseudopodia-like projections and comparative observations with pathogenic blastomycetes, including Sanfelice's and Plimmer's. He has failed to demonstrate from a morphological standpoint the

identity between Plimmer's bodies and transformed yeast organisms. In experimental inoculation of animals with blastomycetes it has been usually possible to cultivate the organism from the inoculated animal.

Gaylord's conclusions may be stated as follows: he identified what he believes to be a parasite in scrapings from, and in fresh sections of, cancer, also in peritoneal fluid in abdominal cancer; he convinced himself of the identity of these structures with Russell's bodies, Plimmer's bodies, and protozoon forms in the tissues; he satisfied himself that the yeast organism could not be confused with the organism observed in fresh scrapings from carcinoma and in his experimental animals.

He seeks further proof of his contention that the organism is a protozoon by the appearances which follow upon the inoculation of the cornea with vaccine virus.

He then passes to the results of the inoculation of animals with material from cancer proved to contain the bodies described. The details are to appear in a later paper, but meanwhile he states that in five animals he got an adeno-carcinoma of the lung, and that one guinea-pig presented what he believed to be a primary carcinoma of lungs and liver.

This communication cannot be regarded but as of great importance, and many will await, with something like impatience, a further instalment of Dr Gaylord's important work. Meanwhile it may be said that if evidence is of any weight it is growing in strength on the side of those who believe cancer to be due to a parasite.

A second paper bearing upon the parasitology of cancer by G. Wlaeff may also be briefly referred to. The title of the paper is "Les Blastomycètes dans la Pathologie Humaine" (*La Presse Médicale*, 30 Mars 1901), but as the investigations were made with the blastomycetes grown by Sanfelice, by Curtis, and by Plimmer, they have a special interest in connection with cancer. This writer has used 510 animals in his investigation. In rats he readily produced a fatal general infection. With regard to the morphology of the blastomycetes he points out that they vary very much in size; and another point is that they sometimes send out processes which join and anastomose with adjoining ones. Seeing that he was working with undoubted blastomycetes this point, if correct, would suggest that Gaylord's opinion, that the parasite is a protozoon, is wrong, and that the appearances on which he based his interpretation might be caused by a blastomyces. Wlaeff immunised animals against the blastomycetes and used their serum for injection into other animals, and found that animals so injected resisted blastomyces inoculation, or that the blasto-

myces action was slower; and he believes that by this method he gave time for the blastomyces to reach and stimulate epithelium to reproduction and that thereby he obtained epithelial new growth. He further has satisfied himself that the virulence of the blastomyces increases as they are passed from animal to animal; and that blastomycetes under different conditions produce different lesions, such as septicæmia, abscesses, pneumonia, nephritis, and tumours of granulomatous or epithelial type. The toxines produced by blastomycetes he finds are very feeble. Professor Curtis in a later number of *La Presse Médicale* disavows any agreement with Wlaeff's conclusions, but we are not impressed with Curtis' argument. Eminent persons who have failed to get positive results are apt to discredit all positive results claimed by other people. History repeats itself with remarkable monotony!

SURGERY

GENITO-URINARY DISEASES

By DAVID WALLACE, F.R.C.S.Ed.,

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TUBERCULOUS disease of the genito-urinary tract is not only important from its frequent occurrence, but also from the difficulty in treatment and the uncertainty of procuring a cure.

Mlle. Gorovitz (*Revue de Chirurgie*, April 1901) points out that during the last few years the belief that tubercle of the female genital organs is rare, has been proved to be erroneous, very numerous instances of the disease having been observed in the vagina, uterus, ovaries, and fallopian tubes. It is recognised that in patients who suffer from tubercle of the lungs or alimentary tract, secondary infection of the genital organs is frequent. Statistics from laparotomies for varying conditions average 2 per cent. of tubercle in the tubes or ovaries, but no data are given to show how often the genital lesion is primary. In twenty-two autopsies of females who died from tuberculous affections, Turner found 18·5 per cent. of genital tuberculosis (*Lancet*, 1899). Stolper in thirty-four autopsies of pulmonary tubercle found seven cases, *i.e.* 20·5 per cent. Some of the older authors (Mosler, Spaeth) give a high percentage of primary infection, but these statistics are not reliable. Any part of the tract may be the seat of tubercle, but the fallopian tubes are most frequently the site of the disease. As in the male the affection is most frequent in early adult life, at the time when the organs are functionally most active. Abnormal conditions of the

vagina predispose to the disease, *e.g.* gonorrhœa, and in the male sex the lesion may descend from above or ascends to organs more highly placed. The view of Verneuill and Cohnheim that tubercle may be communicated during coitus, one or other individual being tubercular, has not been established, and Mlle. Gorovitz carried out a series of experiments on the lower animals with pure cultures of the tubercle bacillus with the object of establishing or reversing the idea. Attention is drawn to experimental work by other observers (Maffucci, Spano and Gaertner), and the contradictory results of these are emphasised. Without injury to the mucous membrane the results were negative in both rabbits and guinea-pigs. When, however, the culture was introduced directly into the uterus, tubercular disease was set up in the guinea-pigs, although no sign of disease was produced in the rabbits. These experiments, which have not yet been completed, do not seem to prove anything further than that from direct inoculation local tubercle can be produced, and it is well known that guinea-pigs are especially susceptible to this organism.

The gravity of tuberculous affection of the epididymis is chiefly due to the tendency of the disease to secondarily invade the prostate, and from it the bladder, giving rise to cystitis and its attendant evils, culminating not uncommonly in renal tuberculosis. The disease is one of adolescent and early adult life, and although usually unilateral may be bilateral. There may be no other manifestation of tubercle, and the history need not indicate any exciting cause. Injury can occasionally be traced as the possible initiation of the disease, but is not infrequently merely the means of directing the patient's attention to the firm painless nodule which is generally the first indication of the disease — the globus major being usually the site. Opinions vary, and statistics accordingly differ, in regard to the affection being more frequently primary or secondary to another focus elsewhere, but on the whole it is admitted that probably the condition is primary in at least 50 per cent of cases (Councilman, Senn). It is more particularly in reference to those which are primary that M. Lonquet, in an elaborate paper (*Ann. des mal. des org. urin.* April 1901), discusses the question of the treatment of this disease. Why the disease should select the epididymis is not readily explicable, and very numerous theories have been advanced, but the majority of authorities allow that most probably the bacilli reach it through the blood, and in virtue of a peculiar arrangement of the blood-vessels find a resting-place (Saltzmann). The author of the paper referred to divides the history of methods of treatment into three periods: 1st, that of *conservative* treatment (1820-

1875), when Dupuytren, Astley Cooper, Verneuill, and many others opposed operation and condemned castration (*a*) because of its danger, and (*b*) because of its inefficiency. 2nd (1875-1895), when *castration* became the operation of choice, and was enthusiastically supported for three reasons: (1) that it was radical; (2) that it was precautionary and prevented extension of the disease; (3) that it was legitimate as it did not endanger life. To this view the majority of surgeons gave their sanction, and only one or two held to the conservative treatment previously advocated. Guyon and Reclus of the French school maintained that the conservative treatment should only be departed from in very aggravated cases, and condemned castration in the early stages of the affection. 3rd, the *conservative* method (1895-1900). The author states that treatment by early castration has again been receded from, and surgeons have gone back to the conservative methods of the first period. Various reasons are adduced for this change in opinion, but the important psychical and physical influence of the testis is especially referred to. To avoid the loss of this testicular influence curetting of the diseased part or excision of it are recommended, the testis being left intact, as, although the seminal fluid can no longer reach the vas deferens, it is absorbed and preserves its influence upon the mental and general health of the individual. It has to be noted that two schools have arisen—one of which recommends no operative treatment whatever, but only medical means; the other which deprecates castration, but advises removal of the diseased portion of the epididymis. M. Lonquet is an adherent of the latter school, and points out the objections to and the inadequacy of the former, which relies on good hygiene, and the exhibition internally of drugs with suitable diet. This treatment the author grants is an excellent adjuvant to surgical measures, which it cannot altogether replace. He discusses four reasons which have been advanced in favour of castration: (1) That it is not dangerous; (2) that it prevents local fistulæ; (3) that it prevents extension of the disease; and (4) that it is radical. Regarding the first of these, which refers to the effect on the general health of the patient, he believes that the removal of one testis has a bad effect, but that removal of both for bilateral disease is distinctly deleterious, and he does not admit that the introduction of an aseptic celluloid, "moral" testis, as suggested by Weir, Guelliot, and others, counteracts in any way the baneful effects of their loss. The conclusion M. Lonquet arrives at is that castration is not needed to prevent fistulæ, or to prevent extension of the disease when a less drastic measure suffices, and that it is in only very aggravated cases of tubercular fungoides of the testis or abscess of its body

that castration is indicated, and that epididymectomy is equally satisfactory as a means of treatment in less extensive cases.

In the second part of this paper the technique of the operation is considered in much detail, but nothing of particular moment is suggested in any way different from the usual methods adopted. One method which is not referred to can occasionally be used with much advantage, viz., to make the incision as in varicocele over the external abdominal ring, and withdraw the testis from the scrotum, excise the nodule or whole epididymis, and then replace the organ. When there are no adhesions to the surrounding parts this can easily be accomplished, and enables the operator to examine the parts very thoroughly without injury to the testis, and excise the disease very exactly.

The change in the operative procedure of tuberculous disease of the epididymis is interesting as set forth by M. Lonquet, and is quite analogous to that which is now more or less routine in tubercle of joints. The criticism, in either case, that minor operations eventually are not so satisfactory is not borne out by statistics. The preface by M. Mickulicz to Mr Cathcart's translation of the "Conservative treatment of Tubercular joint disease" is, as well as the work itself, worthy of perusal in this connection. In it the writer shows that the treatment of tubercular joint affection has passed through precisely the same phases as M. Lonquet refers to in tubercular epididymitis.

When invasion of the prostate has occurred as well as of the epididymis the question of treatment, other than conservative in the sense referred to above, is usually answered in the negative, unless there be some evidence of acute action in the latter; but in those cases where the other testis is healthy, and the prostatic affection not far advanced, excision of the disease by castration of the affected organ is probably indicated. The change in the prostate secondarily to the removal of the testis produces fibrous tissue around the mass, and in this way it becomes practically encapsulated. It is not so satisfactory to treat a case where the nodule in the prostate is on the opposite side to the affected testicle—a condition which is found in a percentage of cases.

GYNECOLOGY AND OBSTETRICS

ON INGUINAL SHORTENING OF THE ROUND LIGAMENTS

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I. Anatomical.

SINCE, as Strassman phrases it, "In its issue the Alexander-Adams operation comes topographically, anatomically, and mechanically most near the natural conditions," it is of some importance to note any information as to its facility of performance and the results finally attained. Clinically much has been said as to the frequency of failure either to find a round ligament at all or at least one strong enough to pull on; and though it is probable that many of the failures are due to the fact that not all of us are good anatomists, it seems from the anatomical papers that there will always remain a minimal proportion of cases where failure is inevitable from developmental defect. Apart from systematic works such as Waldeyer's "Das Becken" (1899) and Sellheim's "Topographischer Atlas" (1900), special anatomical papers have been published by Eisler (*Münchener med. Woch.* 1898, p. 477) and Sellheim (*Beiträge z. Geburtsh. u. Gyn.* Bd. iv. p. 165, 1901). These are based on the examination of series of ten and twelve cadavers respectively, but as the latter includes the results of the former, we need refer to it only.

Sellheim's material included six nulliparæ—five parous women and one at sixty—and, like most authors, he finds that pregnancy has a distinct influence in increasing the thickness of the round ligaments. The increased thickness remains in subinvolution, and we may note also that v. Jordan, when operating in early pregnancy for a retroflexion where the patient could not retain a pessary, found the ligaments thicker and softer than usual. The average length in all sections of the ligament, except in the inguinal canal, was greater in the nulliparæ. This was, Sellheim thinks, an accident of his material.

The position of the external inguinal ring is given by the following data:—From pubic tubercle to mid point of inner pillar, average ·27 cm. out, varying from ·4 cm. in to ·9 cm. out; to mid point of outer pillar, 1·09 cm., varying from ·1 cm. in to 2 cm. out. From linea alba to mid point of outer pillar 4·05, varying from 3·3 to 5·5 cm. There is usually a difference, often considerable, between the two sides. Internal ring: mid line to mid point of inner pillar, 6·3 cm., varying from 4·7 to 8·1 cm.; to mid point of outer

pillar, 6·9, varying from 5·4 to 8·3 cm. Length of inguinal canal, 4·14, varying from 3 to 5 cm. In only one case was the canal of Nuck well marked. The fat-plug (Imlach) at the external ring is very unequal, being sometimes scarcely noticeable, sometimes a thick projecting mass. The external spermatic nerve is sometimes obscured by branches from the abdomen.

The round ligament could, either by directly cutting down on it or by tracing it from within, be shown to reach the external ring or pass beyond it, and spread out with a thickness of 2-4 mm. of tissue either as a compact band or as separate bundles. There was great variety in the individual terminations. Eisler denies the radiation of the fibres towards the labium majus, but Sellheim does not agree with this. The ligament contains smooth muscle fibres from the outer and middle layers of the uterus, striped muscle from the internal oblique, connective and elastic fibres, vessels and nerves. The connective elements increase outwards. It does not usually split into bundles till outside the external ring. The peritoneum often passes smoothly over the point of entrance into the abdomen, and the ligament does not usually become marked for some distance behind the internal ring. The ligaments of the two sides are not equally long. In thickness the ligament measured on the average, at the outer ring, 2·2 mm. and 3 mm. respectively in nulliparæ and multiparæ; at the inner ring, 3 and 3·5 mm. respectively. The least measurement at the outer ring was 2 mm., which was found in eight of the twelve ligaments in the nulliparous cases.

II. Surgical.

Owing to the difficulty in finding the round ligaments, the operation for their shortening has had many modifications suggested and performed. The simple incision over the external inguinal ring has been extended to allow of the inguinal canal being opened in its whole length (Kocher). The extension has been carried to the opening of the peritoneum (inguinal cœliotomy, Goldspohn), and again the ligaments have been sought within the peritoneal cavity by colpotomy and by abdominal section. The methods which include the opening of the peritoneum I shall not consider here, as they introduce many questions of practice, besides the mere change of uterine position. Even with this restriction many differences of technique will be found in the papers of different surgeons, so that it is not easy to decide whose directions we should follow when performing this operation for the first time. With one of the patent American methods, which on paper is as simple as

eating a dinner, after a first temptingly easy success I later on got into trouble. Gradenwitz (*Monats. f. Geburtsh. u. Gyn.* 1901, Bd. xiii. 574) reports the results in 99 cases from the hospital and private practice of Asch in Breslau. Operating at the external ring, Asch found it needful to split the canal in only four cases, one bilaterally. In the second case he operated on, the left ligament was not found, but the right sufficed to give the desired position. I have also had a good result in a case where I found only one ligament, and several like cases have been recorded. Of 66 hospital cases, two had the uterus still retroflexed at discharge. The condition six months or more after operation was ascertained in 46 cases. Thirty-nine were absolutely well; one, where both ligaments had torn but been refound and sutured, had entirely failed. In two a successful operative result had not relieved the symptoms, and one needed subsequent hysterectomy for tubercle. Where the perineum or vagina was defective the appropriate operations were joined to the shortening of the round ligaments, and where the uterus was in fixed retroflexion the adhesions were released by posterior colpotomy. Nineteen pregnancies had occurred in 12 patients; one woman who had abortions previously had had two more. In the 11 patients delivered at term the uterus remained in good position. Of 33 private patients the condition of 30 was later ascertained. Two only were failures, and these had already failed after various operations for the retroflexion. Casati (*Monats.* 1899, Bd. ix. 885) reports the results in 36 of 51 cases. Three had failed, the others were successful, and four patients had had twelve pregnancies without disturbance. He uses only catgut for suture.

Flaischlen (*Sammg. zwangl. Abhandl.* Bd. iii. 2) reports 16 cases operated by splitting the canal. The permanent results were all good. One patient had had a natural labour at term. Wahl (*Monats. und Geburts. u. Gyn.* 1898, Bd. viii. 44) reports on 10 cases. He notes that he had some trouble in operating till, instead of making an incision well above Poupart ligament, he made it directly over that structure. Two were too recent for report as to permanent result, and the others had no recurrence. Kroenig and Feuchtwanger (*Monats. und Geburts. u. Gyn.* 1900, Bd. xi. 621, 795) report on 180 cases from Professor Zweifel's Klinik. In all but two the ligaments were found, and in these they attribute the failure to mistaking a vascular issue or other opening in the fascia for the external ring. The ligament is always looked for at the ring though the canal is split later to give better access to the ligament. If the ligament is very thin even at the internal ring, it has been ligatured within the peritoneum. In two cases it was found

that while moderate traction anteverted the uterus, a strong pull again retroflexed it, and this they attribute to a secondary action at the cervix through the broad ligaments. Two deaths occurred, one from ether bronchitis, and one where extensive colporraphies had also been done, from sepsis, there being a large infected paravaginal hæmatoma. Primary union occurred in 92 per cent. The later results are reported in 68 cases and are tabulated in detail. Of 18 cases of simple Alexander-Adams operation three had recurrence of the displacement. In one of these the stitches had been extruded, in another a hæmatoma had developed, and the third was one of the two cases in which overtraction recalled the retroflexion. In the remaining 50 cases other operations had been combined with the shortening of the round ligaments on account mainly of defective perineum or fixation of the uterus. The results of the operations cannot be individualised, but they were on the whole good. Of the whole series of 68 women 18 had been subsequently pregnant, 7 being so at the time of report. One miscarried in the seventh month, and in those going to term no difficulty was found in cases of simple Alexander operation, and where difficulty occurred it was exclusively due to operations for contracting the vagina.

We see thus that Asch, Zweifel and Sellheim agree that the ligament can usually be found at the outer ring. Sellheim's detailed instructions are to incise outwards parallel to the Poupart ligament 4-5 cm. outwards, beginning 1-2 cm. centrally from the pubic tubercle, and carrying the incision just above the tubercle. To dissect bluntly down to the fascia of the external oblique, downwards and inwards, taking advantage occasionally of the device of pulling on the lower angle of the wound as Rumpf advises, to put the ligament on the stretch. It is almost always possible to find the ligament in this way.

DISEASES OF THE EAR, THROAT AND NOSE

By R. M'KENZIE JOHNSTON, M.D., F.R.C.S.Ed.,

Assistant Surgeon Ear and Throat Department, Royal Infirmary; Aurist Deaf and Dumb Institution

Local Anæsthesia in the Ear and Throat.—In the early part of last year, Dr A. A. Gray brought under the notice of the profession a convenient method of producing local anæsthesia for minor operations on the nose, throat and ear, by the use of cocain dissolved in rectified spirit and anilin oil.

He has found this combination a very useful one, but in order

to obtain a higher degree of anæsthesia without the risk of toxic effects resulting from the use of a stronger solution of cocain, he has experimented with a combination of cocain and eucain with very satisfactory results. Two separate solutions are made: (1) a solution of 20 per cent. of cocain hydrochlor. in rectified spirit, and (2) a mixture of 20 per cent. of beta-eucain in anilin oil. When required for use 10 minims of each of these are mixed and shaken together. The mixture, at first slightly cloudy, rapidly becomes clear, and may be applied to the tissues in the ordinary manner. It is found that the solutions keep better and are more active when mixed at the time that they are required. The resulting mixture is therefore found to contain the ingredients in the following proportions:—

Cocain hydrochlorate . .	10 parts.
Beta-eucain	10 „
Rectified spirit	50 „
Anilin oil	50 „

In about 7 minutes the anæsthesia of the part to which the mixture has been applied is found to be perfect. No disagreeable effects have been met with although occasionally a blueness of the lips has been noticed, from absorption of the anilin. Dr Gray, however, recommends that the maximum amount of the solution to be used at one time should never exceed that which contains 10 minims of the anilin. (*Lancet*, Feb. 1901.) [Anilin oil is a trade name, for the substance is not in reality an oil, though it resembles an oil. It is assumed that it is intended to use the crude anilin oil, as the refined anilin is very expensive.]

Dr St Clair Thompson has recorded a case where symptoms of poisoning occurred from absorption of the anilin from the membrana tympani. The blueness of the face passed off without trouble in a short while.

Dr Wyatt Wingrave has also been experimenting with a view to economy in the employment of cocain while increasing its efficiency. He found that a 2 per cent. solution of this alkaloid in equal parts of almond and petroleum oils was a sufficient anæsthetic for cases where slight anæsthesia was required. While taking longer to act, its effects were more prolonged.

He also found that a watery solution containing 5 per cent. of cocain hydrochlorate and 2 per cent. sodium sulphate proved more rapid and the anæsthesia more complete than when a stronger solution of the cocain was used by itself. This is probably due to the solvent effect of sodium salt on the secretions which protect the mucous membranes to which the anæsthetic requires to be applied. (*Journal of Laryngology*, vol. xv., No. 12.)

Treatment of Hay Fever.—S. Scott Bishop (Chicago), in a short but interesting paper, draws attention to an article in the *International Medical Magazine* by E. B. Gleason, in which the latter records the gratifying results he has experienced in the treatment of hay fever, in subjects of the uric acid diathesis, with hydrobromic and nitromuriatic acids. Bishop, with reference to this as well as to many other recent papers which have quoted him as the authority for this line of treatment, points out the writers have overlooked the fact that, notwithstanding the efficacy of the acid treatment, he has repeatedly emphasised the greater value of an eliminative treatment.

When the blood is rich in uric acid a dose of acid precipitates the uric acid from the blood, and it is stored up in the more alkaline tissues temporarily. He has always endeavoured to make it plain that the use of the acid treatment was recommended by him for temporary relief *only* during an attack. At all other times the remedies should be of such a kind as to cause the uric acid to be thrown out of the system, principally through the kidneys. While therefore acid may be given during an attack it should always be followed by a course of salicylate, salicin, lithium, etc., along with abundance of pure water, and avoidance of excess in sweets and meats.

He recommends a urine analysis in all hay fever cases in order to see whether there is an excess of uric acid as compared with urea. While the relative proportion of uric acid to urea in health is 1 to 33, he found it 1 to 25 in a hay fever patient of his.

In addition to the general treatment recommended it is of course necessary to attend to local conditions in the nose, and not to neglect the use of the cautery where indicated. (*The Laryngoscope*, vol. ix. No. 4.)

Treatment of Laryngeal Tuberculosis.—At the International Medical Congress held in Paris, Dr Vacher (Orleans) discussed the treatment of laryngeal tuberculosis. This depends on the more or less advanced stage of the local lesions and the state of the lungs. In the ulcerative stage it consists in removing vegetations, curetting, cauterising, and the application of topical remedies. After testing many medicaments the author fixed on ether as the best vehicle. After spraying with cocain, he paints the larynx with an iodoform solution, and injects into the trachea a gradually increasing amount of the same, up to 2 c.c. This is usually well borne by the patient, and seldom causes glottic spasm. It was found that the pain was lessened, eating made easier, and respiration more ample. The following is the solution recommended :—

Saturated solution of iodoform in ether .	100 parts.
Guaiacol	9 „
Eucalyptol	2 „
Menthol	1 „

(*Journal of Laryngology* report, Nov. 1900.)

Meetings of Societies

The Edinburgh Medico-Chirurgical Society

THE seventh meeting of the eightieth session was held on May 1st, Mr A. G. Miller, the President, in the chair.

Dr Norman Walker showed a case of Bazins disease.

The girl, aged 16, came to the Infirmary about eight weeks ago with an eruption on one leg, extending up to the waist, which looked something like ecthyma. The lesions were, however, deeper and had a more chronic appearance than the lesions of that disease, and all cultivations from them proved to be sterile. The girl has markedly large cervical glands and some dulness at one apex, with cough and expectoration. The case at that stage was the first definite example he had seen of the condition described by Kaposi as acne scrophulosorum. During her stay in hospital there was no great improvement, but soon after she went home the condition got much worse and she returned with the lesions advanced, and the condition now closely resembles that known as Bazins disease.

He showed two other cases mainly for the interest attached to their treatment. The first was a case of lupus, of very extensive distribution, which he had treated for the past five months with weekly applications of the X-rays, latterly the exposure lasting for twenty minutes. The patient was far from well but the improvement was very marked, and the increase in comfort was alone worth the trouble.

During a recent visit to the London Hospital, where one has an opportunity of seeing both varieties of the light treatment, he was greatly impressed by the success attendant on the much less advertised X-rays treatment. While there on a previous occasion he had seen a further use of the rays in connection with the treatment of rodent ulcer, the results of which were so good that it was almost necessary to see to believe. Large cavities occupied by inoperable cancers had filled up and healed with a smooth scar. The treatment had been commenced on two of Dr Jamieson's patients, and he showed one of them who had had six exposures to the rays.

Mr Shaw M'Laren showed and demonstrated the use of Schlagintweit's catheter-cystoscope. It consists of two parts: first, an ordinary metal catheter, carrying an electric lamp at its point; and second, the telescope part of the ordinary cystoscope, which is pushed down into the catheter, so that the prism lies in the eye of the catheter, and exactly fits and closes it. The catheter part is introduced into the bladder in the usual way, the bladder can be washed out and filled with clean fluid, and then, *without further change*, the telescope-tube is pushed in, and the examination proceeds. The bladder can be re-cleaned as often as required through the instrument which remains in position. The advantages are enormous, as the bladder suffers the minimum of irritation, and there is no risk of setting up fresh bleeding as so often happens with the ordinary cystoscope. It is also fitted with an admirable arrangement by which it can be connected with a "douche-can," and with a small siphon collector below for showing when the fluid is clear.

Dr Paterson showed a series of naked eye specimens in glycerine jelly to illustrate the pathology of some of the graver forms of eye diseases. These included eight examples of intra-ocular tumour, and a number of specimens illustrating especially the results of injuries of the eyeball and the pathology of glaucoma and sympathetic ophthalmia. He also showed a large number of lantern slides, mostly illustrative of the same class of cases. The infiltration of the sclera which often accompanies the severer uveal inflammations following injury was cited as a strong argument against evisceration or Mules' operation in all but the most recent cases of injury. In cases of choked disc attending cerebral tumour, Dr Paterson alluded to the enormous infiltration of the arachnoid sheath of the optic nerve which is so often present in these cases and might be an important factor in the production of the choked disc through pressure on the central artery and vein in their passage through the nerve sheaths.

Dr W. Russell read a paper on "Arterial hypertonus and arterio-sclerosis: their relations and significance," with lantern and microscopic demonstration.

THE eighth meeting of the session was held on May 15th, Mr A. G. Miller in the chair.

Dr Alexander Bruce showed a girl with almost complete paralysis of the right brachial plexus. She was working at a carding machine nearly a year ago when her arm was caught in a pulley. For the next twenty-four hours she was unconscious, but there was no external injury visible. There is complete

loss of power in the right upper limb and complete anæsthesia, except over the circumflex region, where sensation is preserved. She has not improved in the least, and atrophy progresses; all the muscles are in a state of flaccid paralysis; there is no reaction to the faradic current and a very feeble one to the galvanic. Except for the serratus magnus there is no power in the arm whatever; there is marked lividity and great coldness of the hand, its temperature being 14° lower than that of the left. She shows very characteristically the effect of injury to the first dorsal nerve at its root, viz., the narrower palpebral aperture, the less-marked protrusion of eyeball, the distinct myosis. There is also a flattening of right cheek which is difficult to explain.

Dr Bruce also showed a young woman with disseminated spinal sclerosis of an uncommon type, which began two years ago with weakness in right hand. There are marked intention tremors and very marked nystagmus, and the ability to walk is now almost lost.

Dr Byrom Bramwell showed an unusual form of muscular atrophy in a sailor, aged forty-one, who enjoyed good health till two and a half years ago, when gradual loss of power commenced in one foot and then in the other. Eight months later his hands became involved, first the right and then the left. He was hardly able to feed himself or to walk; he has had some cramp-like pains; his general health has been good; there is no sensory disturbance, no affection of bladder or rectum. During the last year his condition has improved so that he can now walk two or three miles. It is certainly not an ordinary case of progressive muscular atrophy; here it began in the lower limbs —in upper limbs it is confined below the elbow and in the legs below the knee. His duck-like gait is highly characteristic of a paralysis on the front of the leg. There was no trace of any hereditary condition. The peculiar distribution, the mode of commencement, and the limitation to distal parts of limbs put ordinary progressive muscular atrophy out of account. It was not peripheral neuritis, because there was no muscular tenderness and no sensory symptoms; nor beri-beri, because no œdema, pain or numbness. Some cases had been described in which both peripheral nerves and cord were affected. It was evidently a distinct type.

Dr Byrom Bramwell also showed a characteristic case of syringomyelia in a man of forty. Patient was admitted to hospital for Bright's disease, and while there it was discovered that he had complete loss of sensibility to pain over upper part of trunk, complete loss to cold and imperfect loss to heat, also the bird-claw hand, of which he was unaware. There had been

some painful sores on his hand; his head was not symmetrically shaped—there was a marked projection of one side of it.

Dr E. Carmichael showed a hypertrophic condition of integument, probably due to distended lymphatics, in a man of forty-five who, twenty years ago, received a blow on the right cheek by a cricket ball. Since then there has been a large nodule on the cheek, and several similar but smaller nodules have made their appearance on different parts of the body. Eight years ago the right foot and leg began to swell, and now there is an enormous swelling of the whole right lower limb, which extends over the buttock. The right knee is completely disorganised, so that the hand can be inserted into the joint, as if the articular surfaces were destroyed. There has been no improvement under rest, elastic pressure, iodide, and arsenic. One of the nodules was examined and found to be a fibro-sarcoma.

Dr Boyd showed a young woman with stenosis of the pulmonary valve. Patient came to hospital with rheumatic fever and exophthalmic goitre; she had a systolic murmur with point of maximum intensity in the second interspace to left side of sternum. Under salicylate the pains diminished and temperature fell. She now has the murmur very marked, but she has not the cyanosis seen in cases which come on in fœtal life, and this points to lesion having come on later in life. Perhaps it was due to a previous attack of rheumatic fever which she had. The murmur stops about the clavicle, there is the usual thrill, and all the other signs of pulmonary stenosis.

Mr Caird showed a man, aged 51, from whom he had removed a gastric carcinoma, and on whom he then performed gastro-enterostomy. In November 1900 he weighed 10 stone; in April 1901 he weighed 8 stone 4 lbs.; there was before the operation, three weeks ago, an excess of hydrochloric acid, and a certain amount of lactic acid. He was now gaining weight rapidly.

Mr Caird also showed a patient on whom he had operated for malignant disease of the stomach, and performed posterior gastro-enterostomy.

Mr Alexis Thomson showed a patient after enterectomy for multiple tuberculous stricture of small intestine. There had been incomplete obstruction of the small intestine of one month's duration, and the distended coils in the umbilical region showed visible peristalsis. Nine years ago there had been an attack of enteritis, and so tuberculous matting was thought likely to exist. At the operation a number of distended coils were found matted together with miliary tubercle of the serous surfaces, and several strictures; 22 inches of bowel were removed, including the tubercular strictures.

Mr Stiles showed a boy after operation for idiopathic cerebral hæmorrhage. He named it idiopathic because he had been unable to ascertain the cause. The condition was very rare in children. He was quite well till six months ago, when one day he felt unable to do his lessons as well as usual; he hesitated in his speech, looked grey and ill, and within twelve hours had nine attacks of general convulsions. Left-sided hemiplegia resulted, he became unconscious and passed urine and fæces involuntarily. Next day he became more conscious, but the paralysis persisted and became complete. No traumatism could be found. On the fifth day he was trephined over the central motor area on right side, this position being selected because of the pain over right frontal eminence, and the great pain he had on raising his head from the pillow. The dura bulged but there was no pulsation, the brain began to protrude and cracked across in two places, and a clot oozed out; further clots were scooped out. On the following day he was quite conscious; it was eight weeks before the hernia receded and the wound healed; the paralysis had now almost entirely disappeared.

Mr Cotterill showed a woman with rodent ulcer under treatment by the X-rays. Three years ago a rodent ulcer was removed and remained healed for eighteen months when it recurred, gave rise to much pain, and spread beyond the reach of surgery. It had improved very notably under the X-rays, the pain and fœtor being much less, and the general appearance of the ulcer more satisfactory.

Mr Cotterill also showed a hæmophilic patient with affection of the knee and elbow joints, which looked very like tubercle, with, however, the entire absence of pain on pressure or otherwise. The knee was aspirated, and several ounces of blood drawn off. The condition came on in a subacute manner, extending over months.

Dr Scott Skirving exhibited (1) a brain showing track of Mauser bullet; (2) a brain from case simulating rupture of meningeal artery. The case was that of an old woman who had fallen downstairs and was brought to hospital with symptoms of fracture of the base, plus a clot on left side. There was almost complete paralysis, the left pupil was dilated, the right contracted. The meningeal was not found ruptured, but there was great laceration of the temporo-sphenoidal and also frontal lobes, the blood having welled up and produced symptoms simulating rupture of the meningeal artery.

Dr Skirving then showed specimens illustrating effect of bullet impact on femur—the extensive comminution; also, a stomach nine days after operation for perforation performed three and a half hours after the sudden pain and collapse;

lastly, a large perineal tumour (5 lbs.) from a man aged eighty who had carried it all his life.

Dr A. Bruce showed microscopic specimens and photographs of progressive muscular atrophy, amyotrophic lateral sclerosis, and glioma of pons.

Mr Caird showed (1) a pyloric tumour; (2) vesical calculi; (3) vesical papillomata.

Mr Alexis Thomson exhibited (1) twenty-two inches of small intestine, showing four tuberculous strictures; (2) syringe for iodoform injections.

Dr Logan Turner exhibited (1) two casts showing congenital malformation of the auricle; (2) larynx from a case of primary laryngeal diphtheria.

Mr Stiles showed (1) intestines from a case of so-called idiopathic distension of the colon; (2) sarcoma of testicle from a child aged fourteen months.

Edinburgh Obstetrical Society

THE sixth ordinary meeting of this Society was held on the 8th May, Dr F. W. N. Haultain, Vice-President, in the chair.

Professor Campbell Kynoch, Dundee, contributed the first paper on "Primary Carcinoma of the Female Urethra." He stated that such growths were, previous to the classification proposed by Winckel, generally classed under the single heading of Vascular Tumours. Winckel classified urethral growths into condylomata, glandular tumours, connective tissue tumours, angiomata and epithelial growths. It was with the latter that the paper dealt.

The urethra was one of the organs most rarely affected by carcinoma—the number of published cases not exceeding thirty, while that of the male urethra was only about twelve. It was difficult to explain why malignant disease of the female urethra should be so rare, presenting as it does, conditions which are supposed to predispose to cancer. Fritsch suggested that the constant washing which the urethra receives from the passing urine, together with the frequent dilatation and contraction of the canal, prevented the cancer cells obtaining that fixation necessary for their growth and development. Unfortunately, however, this washing process does not prevent the gonococcus from invading the urethra. Hollinger has pointed out that repeated irritation which one meets with in urethritis, etc., gives rise to the production of scar-like tissue in place of normal mucous membrane, and so predisposes carcinoma.

Malignant disease of the female urethra was first observed by Robini in 1844, and two years later Melchiori published four cases, Winckel in 1878 published two cases, in one the growth

was pedunculated and had its origin in the urethral mucous membrane. The other case was associated with cancer of the bladder.

Secondary cancer of the urethra, although more frequent than primary, is not often seen. Gusserow found that of 311 cases of cancer of the uterus, the urethra was only affected in 56 cases as compared with 128 of extension to the bladder. Doubtless the death of the patient prevents the chance of such extension taking place. Primary cancer of the urethra appears to be rarer than the periurethral form. Deitzer found in 18 cases, 7 primary, 11 periurethral; Bosse found in 25 cases, 20 periurethral, and 5 primary. Ehrendorfer in 27 cases found only 5 primary. The primary form has its origin most often in the epithelium or glands of the urethral mucosa, where it forms either a vascular polypoid growth or a hard nodulated sessile tumour, spreading along the floor of the urethra towards the neck of the bladder and eventually by deeper extension producing a urethro-vaginal fistula.

The periurethral, or more correctly the vulvo-urethral, has its origin in the epithelium at the junction of the urethral orifice and vestibule, from which it spreads spirally round the urethral wall, thus differing from ordinary vulvar cancer which spreads superficially to adjacent structures, the urethra being seldom involved.

Urethral cancer occurs in patients of all ages, though most frequently after the menopause; the early symptoms, pruritus and dysuria, are not severe enough to cause the patient to seek advice soon, and cases usually present themselves only where there is incontinence of urine or a tumour is found.

The treatment, essentially operative, has not given very favourable results. Only Winckel and Melchiori are able to report two cases free of recurrence after intervals of three and six years respectively. Early recognition of the disease is the important factor.

Dr Kynoch recorded a case of urethral cancer which had come under his own observation, and for which he had operated. Three months subsequently, however, the disease recurred and the patient died several months afterwards. The *post-mortem* examination showed that the disease was confined to the lower part of the bladder, and there was no involvement of the surrounding parts.

The second paper was contributed by Dr J. B. Buist, F.R.C.P.Ed., "On the Art of Vaccination." He first discussed those methods of operating which he had found to be the best, and described the various instruments which were commonly in use. The secret of successful re-vaccination was not to

vaccinate an adult more severely than an infant. The area of insertion which Dr Buist makes for adults and infants alike is one square line for each insertion. The reason for this is that you want to produce a vesicle and you want a covering for it. If you scratch away all the epidermis which is to form the covering of the vesicle, you cannot get such a covering. The horny layer of the epidermis confines the inflammatory exudation which spreads beneath it in a circular fashion from the point of insertion. Thus in order to have the benefit of this horny layer you must leave it and not scrape it off. In your scraping you ought only to remove an amount of one square line in area. If this be done then good vesicles will be obtained both in adults and infants. Dr Buist had a Report of more than 1600 re-vaccinations done in elementary schools in Edinburgh. Of 1622 children so examined, 800 were vaccinated with one mark; 735 with two marks; 43 with three marks; and 44 with four marks. Of these 351 were severe cases (26·8 per cent.), and occurred mostly with one or two marks. The insertion success was 82 per cent., and the case success was 80·5. The fewer abrasions the better, and a good protective vaccination should cover half a square inch of surface. Dr Buist had not found the use of dressings for the arm useful or advisable.

As regards glycerinated calf lymph, Dr Buist stated that the glycerine keeps the lymph from putrefaction but it does not keep it active. He could not keep such lymph active for more than a month. It will not produce 95 per cent. of insertion success if kept longer, and Dr Buist does not believe that its protective power is so good as pure lymph itself. The author drew attention to the escharotic action of vaccine materials in certain unprotected persons; this effect might be due to the fact that an irritant material was applied to a raw surface.

The paper was discussed by Dr Connell (Peebles), Dr James Ritchie, Dr Rattray, Dr Keppie Paterson and others.

New Books and New Editions

The Pathology and Surgical Treatment of Tumours. By N. Senn, M.D., Ph.D., LL.D., Professor of Surgery, Rush Medical College, Chicago. Second Edition. Crown 8vo, pp. 718, with 400 Illustrations. Philadelphia: W. B. Saunders. 1900. Price 21s. net.

Although it is now about ten years since the first edition of this work appeared, the writer confesses in his preface to the

present issue that since then "no great discoveries or advancements have been made concerning the nature and treatment of tumours." From this admission alone it may be surmised that the author is not yet a convert to the belief in the parasitic origin of malignant tumours, and this impression is abundantly confirmed by the reiterated opinion that at present the verdict on this vexed question must be one of "Not proven." In the chapter on Carcinoma a fairly full resumé of recent work in this field of pathological research is given, but although Roncali is quoted, we miss any reference to the important work of Russell, Sanfelice and Leopold with regard to the blasto-mycetic nature of the bodies found in cancerous tumours. The author himself retains on this whole subject an open mind, and expresses himself hopeful that in time the prophesied results will be obtained, and that with the discovery of the true cause of cancer will come some means by which it may be treated with more success than seems at present possible.

The general plan of the work remains unaltered, although the text has been carefully revised and amplified, and the illustrations, which are on the whole excellent, have been brought up to date.

The author complains that the investigation of tumours has been greatly neglected by surgical pathologists, who have devoted all their attention to the more novel and fascinating study of bacteriology and infective diseases. While this may to some extent be true, it must still be admitted that our improved knowledge of inflammatory diseases has been the means of simplifying our conceptions of tumours, by enabling us to transfer the consideration of many of the infective granulomata to its proper place in surgical pathology. This opinion is reflected in the author's definition of tumour—"A tumour is a localised increase of tissue, the product of tissue-proliferation of embryonic cells of congenital or post-natal origin, produced independently of microbic causes."

The first chapter on the origin and nature of tumours is thus summed up: "In the absence of a more plausible theory, the writer is forced to conclude that every tumour is the product of tissue-proliferation of a congenital or post-natal matrix of embryonic cells, aroused into activity by a general or local physiological stimulation or by congenital or acquired abnormal conditions in its immediate environments."

After two short but useful chapters on the morphology of tumour cells, and the anatomy and biology of tumours, follows a brief consideration of the various degenerative and other changes to which tumours are liable. We are told that tumour tissue is subject to the same degenerative changes as normal

tissue altered by accident or by disease, and that it constitutes a *locus minoris resistentiæ* in the event of direct or indirect infection with pathogenic microbes." The chapter on the etiology of tumours is full of interest, although it must be confessed it does not add anything of definite value to this obscure subject, consisting as it does merely of a resumé of long-established knowledge.

It has always appeared curious that we should know so little of the causes of the cancerous cachexia of which unhappily we see so much, and the author has nothing to tell us beyond stating that it is due to impaired nutrition and to the introduction into the circulation from the tumours of toxic substances.

The author strongly supports the popular belief that the transformation of a benign into a malignant tumour is a common occurrence, and expresses the opinion that this view should be urged upon the laity by the medical profession, rather than contradicted as it so frequently is.

The chapter on the diagnosis of tumours is one of the most useful in the book. Throughout his work Professor Senn has made a free, judicious and helpful use of italics, but we scarcely feel that this artificial aid is called for to emphasise the obvious fact that "by comparing the size of the tumour when first discovered with its present size, and estimating the time that has elapsed, we are in possession of facts which enable us to judge, at least in an approximately correct way, the rapidity of growth of the tumour." In referring to the tactile examination of tumours, the author throws out a suggestion to teachers that the student should be informed what he is expected to find and to feel before he proceeds to make the digital examination. With every deference to so distinguished and successful a teacher as Professor Senn, we venture to think the student will learn more if the teacher makes him describe what he does feel. Too often we fear the student feels what he is told he ought to feel, even if at the same time he is palpating the wrong part of the patient's body.

While many clinicians will probably agree with the author's [illegible] appreciation of the value of the microscope in the diagnosis of tumours he can scarcely expect the same support from surgical pathologists; and we doubt the good taste of quoting at such length the historical instances in which clinical and microscopical evidence were so strongly opposed (p. 103).

The descriptions of the various methods of treating tumours are [illegible] but we doubt if including such procedures as "ligature of the principal blood-vessels nourishing the tumour," "galvano-caustic incisions," or the "injection of erysipelas [illegible] makes for clearness. In re-

ferring to treatment by electrolysis, the author quotes, without contradiction, Billroth's fear that this procedure may result in dangerous if not fatal gas-embolism. This statement, and the fact that the only reference he makes to the treatment of angeiomata by electrolysis consists in his stating that it "has a limited sphere of application in the treatment of superficial nævi," seem to indicate that the author has had little experience of the method, and is unacquainted with John Duncan's classical work on this subject.

A chapter on the never ending subject of the classification of tumours finishes the general part of the work. The author's classification is based on the origin of the tumour matrix from the germinal layers of the embryo, but we must confess that it does not make matters much clearer than most of the other classifications which have been suggested.

The rest of the work is occupied with a full description of each individual variety of tumour, under the headings of definition, histology and pathology, topography, diagnosis, prognosis and treatment. To a large extent this section is a compilation of published cases, many of them rare, and all interesting, and it furnishes a valuable source of reference,—albeit the index is woefully deficient. The most important chapter is that on carcinoma, which extends to 174 pages. The description of angeioma is unsatisfactory, and that on neuromata will require to be revised in the light of Thomson's recent work. Retention cysts are dealt with specially at the end of the book, an arrangement which has much to commend it.

The publisher deserves much praise for the excellence of the paper, type, and illustrations. "SCOT."

A Manual of Materia Medica and Pharmacology, comprising all Organic and Inorganic Drugs which are and have been official in the United States Pharmacopœia, together with important allied Species and useful Synthetics. By DAVID M. R. CULBRETH, Ph.G., M.D., Professor of Botany, Materia Medica, and Pharmacognosy in the University of Maryland Medical and Dental Schools. Second Edition, enlarged and thoroughly revised. Pp. 885, with 464 illustrations. London: Rebman Limited. 1901. Price 20s. net.

IN the States, pharmacology is still used in two senses. By some it is confined to the action of drugs on the healthy and diseased organism, as in Britain and Germany; by others it is extended to comprise all that can be known of drugs, and

apparently that is its meaning here. The book is mainly devoted to what we term Materia Medica. It gives a full description of the animal, vegetable, and mineral substances used in medicine, with their source, constituents, preparations (U.S.P.), adulterations, etc., and an epitomised description of their pharmacological actions and therapeutic uses. The plan of the author is "to associate as nearly together as possible those substances, organic and inorganic, which have a common or allied origin, allowing those next related to follow in regular order, the basal or parental source thus being kept paramount."

The vegetable materia medica, which is the largest, and, it seems to us, the best part of the book, has been arranged mainly on the lines of Engler and Prantl's "Die Naturlichen Pflanzenfamilien." It commences with the thallophyta and ends with the compositæ. The animal materia medica is arranged on a similar developmental plan, while the mineral part is classified in the usual way. There is an introduction dealing with the mode of administration of medicines, the conditions modifying their action, and the various classifications of them which have been adopted. In Part V. non-pharmacopœial organic compounds are dealt with; and in Part VI. the microscope and its uses in materia medica are described. An appendix contains the treatment of the commoner forms of poisoning, remarks on the writing of prescriptions, and tables of weights, measures, etc. A number of recapitulation tables increase the usefulness of the book.

On the whole the work is well done and up to date. In a few places we miss the most recent work on the constituents of drugs, and in a few others we think the composition of the drug might, in a work of this size, have been given more fully. Only the more important alkaloids of opium, for example, are mentioned. We doubt, too, the advisability of giving the pharmacological action and therapeutic uses of the drugs in this remarkably terse way, and especially in a book almost solely adapted for druggists. It cannot impart any definite information to the reader, and may even lead him astray. Some of it, too, is fallacious. Digitalis, for example, is said to cause death from over-stimulation of the heart muscle and its contained ganglia, "the stimulation being so powerful as to squeeze out all the blood, thus causing death in systole." In mammals, after poisoning by digitalis, the heart is always in greater or less diastole.

The terse phraseology in which the book is written is one of its worst features. It has led the author to speak of "pregnant constipation" and to write such descriptions as this under treatment of poisoning by acids—"Carbolic, creosote, resorcin:

the pneumogastric filaments, in mucous membrane of the stomach, are usually so obtunded as not to respond to emetics, so if thought safe, empty stomach with pump or hypodermic apomorphine," etc.

With a little more elegant diction and a little less misleading pharmacology and therapeutics, we should think very highly of the book. The plates are good and the pure materia medica is admirable. We have met with very few mistakes in this part, and those are of a minor character. On p. 766 the formula of α-naphthol is given, and β-naphthol is described below. Unfortunately the preparations given are those of the U.S.P. alone, which lessens its value to workers in this country, but this part is not a strong feature of the book.

"PHARMAKON."

A Text-book of the Diseases of Women. By HENRY J. GARRIGUES, A.M., M.D., etc. Third edition, thoroughly revised. Pp. 756, with 367 illustrations. Philadelphia: W. B. Saunders and Co. 1900.

THERE is little need to say much for this well-known book, which has required a new edition in two years. It is well up to date, and the introduction of a series of new illustrations makes it, as the preface says, a complete atlas of the embryology and anatomy of the female pelvic organs. It would, however, be much improved by the omission of several of the old cuts which do not effectively exhibit the diseased conditions and by a considerable reduction of the figured armamentarium and furniture. There is an ample index, and some useful points of practice not always found in text-books give the volume a special value for practitioners.

"G. P."

Lectures on Medical Jurisprudence and Toxicology. By FRED. J. SMITH, M.A., M.D., F.R.C.P. Pp. 396. London: J. & A. Churchill. 1900. Price 7s. 6d.

THIS work does not pretend to be an elaborate text-book on this subject, but the principles of medical jurisprudence are explained in such a clear and concise manner that students preparing for examination will find it of great value.

It is not a cram book of the usual kind. The different branches of the subject are treated with considerable detail, and the arrangement of certain parts in the form of tables

enables the student to grasp with readiness the important points necessary for forming a correct judgment in medico-legal cases.

The subject of toxicology is well treated, but we observe that the author's views on criminal responsibility in cases of insanity are at variance with those of alienists and medical jurists generally. He is of opinion that "it is at present too easy to earn a comfortable home for life at Broadmoor Criminal Asylum by committing murder."

Altogether the work is one to be commended both to the student and the busy practitioner, who will find in it all he is likely to require in medico-legal work.

Passes at University and College Examinations

Royal College of Physicians, Edinburgh; Royal College of Surgeons, Edinburgh; and Faculty of Physicians and Surgeons, Glasgow

THE quarterly examinations of the above Board in Edinburgh were concluded on 27th April, with the following results:—

First Examination, Four Years' Course.—Of four candidates entered, the following two passed the examination:—Fergus Donald Yourella, Dublin, and Alexander Wood, Pencaitland, and one passed in elementary anatomy and one in chemistry.

First Examination, Five Years' Course.—Of twenty-one candidates entered, the following seven passed the examination:—William Herbert Boalth, Kampti, India (with distinction); Broderick Edward Middleton Newland, Bangalore, India; Maurice Michael Fitzgerald, County Limerick; Edward Ernest Murphy, County Cork; Robert David Hirsh, Bombay; John Edmund Cox, Hastings; and David Ahern, County Cork; and two passed in physics, one in elementary biology, and one in chemistry.

Second Examination, Four Years' Course.—Of fourteen candidates entered, the following four passed the examination:—Shaik Abdul Rahman, Burma; George Adams MacFarland, Ballycastle; Darabshaw Fardoonjee Sanjana, Bombay; and Norman Edward Gibbs, Melbourne; and one passed in anatomy and three in materia medica.

Second Examination, Five Years' Course.—Of nineteen candidates entered, the following ten passed the examination:—

Valiant Galfred Ffrost, Australia; William Cooke Renshaw, Cheshire; Arthur Joseph O'Leary, Liverpool; Thomas Dishington-Smith, Shetland (with distinction); Samuel John Graham, Lisbellaw; Michael David Ahern, County Cork (with distinction); Katharine Charis Davies, Llanerchymedd; Leo Levi, Adrianople; Henry Joseph Patchett, Lancashire; and Benjamin Bird; and two passed in anatomy and one in physiology.

Third Examination, Five Years' Course.—Of twenty-three candidates entered, the following sixteen passed the examination:—Robert Chisholm, Assam; John Browne Grogan Mulligan, Courtrai, Belgium; John Boyd, Ireland; Thomas Fryer Okell, Cheshire; William Bates, Partick; Donald Grant Dingwall, Ross-shire; Harry Anderson Lunn, Jedburgh; Ryder Percival Nash, Cork; Cecil Richard Martin, Culcutta; Walter Sykes, Preston; James Turnbull Playfair Heatley, Northumberland; George Dean Bateman, Cork; William Ernest Graves, Dublin; Augustus Charles Lorena, India; Frank Audubon Gray, Armagh; and Henry Joseph Patchett, Lancashire; and three passed in materia medica.

Final Examination.—Of eighty-four candidates entered, the following thirty-nine passed the examination and were admitted L.R.C.P.E., L.R.C.S.E and L.F.P. & S.G.:—Frederick William Birkett, Canada; Edgar Emrys Evans, Bengal; Emma Rose Winckler King, Travancore; Honorine Forbes, Burma; Prudence Elizabeth Gaffikin, Belfast; Charlotte M'Crea, Glasgow; John Tudor Griffiths, Flintshire; Joseph Swinburn Townley, Cumberland; Agnes Benjamin, Sealkole; John Wilson Dickson, County Tyrone; Thomas Baker Haig, Melbourne; George Evans, County Derry; Arthur Rodney Mansell, Christchurch; Alexander Mein Hardie, Edinburgh; William Turner, Glasgow; Henry John Clague, Sheffield; Arthur Mellor Crosfield, Liverpool; Charles Russell Sutherland, County Durham; William Smith, Cambridge; David Fyfe, Glasgow; Ernest Leon Maunsell Hackett, Cork; Ernest George Dryden Benson, County Durham; Robert Thompson, Coleraine; Archibald Balfour Nairn, Kopunda; George Kee, Greenock; Edmond Joseph Kelleher, Cork; Basanta Kumar Chatterjee, India; Daniel M'Intyre, Littleborough; Edwin Robert Thomas, Dowlais; Charles M'Donnell, Limerick; Harold Crossley Hildreth, Bombay; Philip Harry Parsons, Loughton, Essex; John Gemmell Welsh, Glasgow; William Archibald Coulter Spence, County Down (with honours); Hannibal Ernest Herbert Lewis, South Wales; Thomas Arthur Ball Harris, Ollerton, Notts; John Archibald Campbell, Inverness-shire; James Marshall Campbell, Banffshire; and Augustus Charles Lorena, India; and two passed in medicine and thera-

peutics, one in surgery and surgical anatomy, ten in midwifery, and seven in medical jurisprudence.

Royal College of Surgeons, Edinburgh

THE following gentlemen having passed the requisite examinations were, at a meeting of the College held on 16th inst., elected Ordinary Fellows :—Joseph Beard, M.R.C.S.Eng., L.R.C.P.Lond., Bradford; Ernest Clarkson Bourdas, M.R.C.S.Eng., L.R.C.P.Lond., London ; George Lyall Chiene, M.B., C.M., Edinburgh ; Walter Thomas Clegg, M.R.C.S.Eng., L.R.C.P.Lond., Liverpool ; John Herbert Gibbs, L.R.C.S.E., L.D.S., Edinburgh ; George Halley, M.B., C.M., Dundee ; Augustus Kinsey-Morgan, M.R.C.S.Eng., L.L.C.P.Lond., Bournemouth ; John Livingston, L.R.C.S.E., Edinburgh ; George Darell Maynard, M.R.C.S.Eng., L.R.C.P.Lond., London ; William Morrison Milne, M.B., C.M., Edinburgh ; William M'Kay, M.B., Ch.B., Edinburgh ; William Ramsay Nasmyth, M.B., C.M., Fife ; Robert Stirling, M.D., Perth ; and Thomas George Wilson, M.B., L.R.C.S.E., London.

The gold medal presented to the College by Colonel William Lorimer Bathgate, in memory of his late father, William M'Phune Bathgate, F.R.C.S.E., as a prize in materia medica, was after examination awarded to Robert Bathgate Johnston, 10 Cornwall Street, Edinburgh.

Royal College of Physicians, Edinburgh ; Royal College of Surgeons, Edinburgh ; and Faculty of Physicians and Surgeons of Glasgow

THE following gentlemen having completed the requisite examinations of the Conjoint Board were admitted Diplomates in Public Health : — Charles Harold Johnston, Melbourne ; George Harper Wilson, Glencorse ; Thomas Rogerson, Greenlaw ; and Charles Carmichael Forrester, Glasgow.

University of Edinburgh—Faculty of Medicine

THE following is the official list of passes at the recent first, second, and third professional examinations for degrees in medicine and surgery :—

First Professional Examination.—Francis Aitken, J. C. D. Allan, William Anderson, W. F. Archibald, Francis Baillie, M. M. Suffad Beg, A. M. Black, Richard Bladworth, Thomas Campbell, John Chisholm, A. G. Cook, J. G. Craig, D. C. Crole, E. G. Deverell, Pollok Donald, G. T. Drummond, F. E. Field,

G. H. L. Fitzwilliams, O. M. Gericke, J. M. Grant, Thomas Grant, Charlotte R. Greenfield, O. C. Greenidge, T. A. Gregg, John Grieve, J. D. Harmer, Ada A. Hatchard, R. W. D. Hewson, Jane S. Hogg, J. G. Hume, T. Scoresby Jackson, J. F. James, J. P. S. Jamieson, A. A. Jardine, Olive T. Leonard, John Lindsay, S. M. Livesey, W. L. Locke, F. J. Luck, William Lumsden, A. D. M'Callum, C. I. M'Farlane, James MacKenzie, A. C. M'Master, N. N. G. C. M'Vean, William Magill, Alfred Malseed, H. G. Marshall, William Martin, C. E. F. von Mengershausen, H. P. Milligan, C. E. S. Mitchell, J. S. Mitchell, Venancio Moralejo, H. B. Morris, G. P. Norman, H. J. Norman, G. O. Norrie, Garfield Ormrod, W. J. Paterson, A. C. Pickering, Agnes E. Porter, J. R. Robertson, D. W. Sibbald, E. M. Simmers, Oliver Smith, S. A. Smith, W. T. Smith, William Stenhouse, H. G. Sutherland, J. R. Tannahill, W. B. Tannahill, F. J. G. Tocher, A. N. J. Vizarat, Frances M. Wakefield, R. C. Walker, R. W. L. Wallace, H. E. A. Washbourn, J. S. R. Weir Elsie B. Wilkie, R. M. Wishart.

Second Professional Examination.—Daniel Allison, G. C. Anderson, J. A. Anderson, F. L. Atkinson, C. M. Begg, James Bentley, A. W. Beveridge, T. C. Blackwell, William Blackwood, F. H. Borthwick, J. C. Boyd, Edith C. Brown, G. L. Brunton, G. Macqueen Brunton, Angus Buchanan, H. H. Bullmore, R. A. Chambers, Kate J. S. Clark, Elizabeth L. Colby, A. F. R. Conder, C. H. Craig, R. W. Craig, C. S. Crichton, Sam Cunliffe, Henry Curwen, Arthur Dangerfield, H. S. Davidson, James Davidson, W. H. Davison, D. E. Derry, A. C. Devereux, J. M. Dewar, James Donaldson, A. M. Dryden, G. J. Fairie, John Findlay, John Fortune, A. C. Geddes, C. R. Gibson (with distinction), J. D. Giles, James Girdwood, Alexander Gray, M.A., H. W. Gush, A. A. Hall, M.A. (with distinction), C. R. F. Hartley, George Henderson, R. L. Henderson, A. E. Hodgson, A. F. Hughes, Isaac Ivey, J. M. Johnston, R. W. Johnstone, J. H. Kay, J. W. Keay, I. C. Keir, M. I. Ali Khan, J. M. Kirkness (with distinction), L. A. H. Lack (with distinction), F. W. Lundie, Hugh M'Calman, G. S. Mackay, T. H. Mackinnon, William MacLaren, J. B. M'Neill, I. M. Macrae, P. W. Mason, A. S. Millard, G. H. S. Milln, W. C. Morton, M.A. (with distinction), Ernest Muir, C. H. Muller, H. L. Munro, A. E. Nalborough, D. M. Newton, Harry Overy, T. C. E. Parry, D. D. Paton, M.A., Thomas Peebles, J. A. Pottinger, Julia L. Pringle, J. A. Raubenheimer, William Readman, Eva A. Robertson, Amy Robinson, Mabel Ross, J. A. Roux, N. C. Rutherford, D. G. Addison Scott, G. H. Skinner, S. W. Smith, Eva M. Snowball, Henry Spiers, Amelia Sutcliffe, J. M. Taylor, A. B. M. Thomson, Louis Turiansky, Robert Veitch, W. R. S. Watkins,

G. J. Wentzel, D. H. Wessels, W. D. Wright, G. W. Young, William Young.

Old Regulations.—R. J. Irving, Harry Whittaker, J. O. Williams.

Third Professional Examination.—Lewis Anderson, R. G. Archibald, James Arthur Mohomed Ashruff, Alexander K. Baxter, Breadalbane Blacklock, C. H. Rosenberg, J. R. Bosman, E. A. Braine, G. B. Brand, R. D. Brown, W. A. Brown, Archibald Brownlie, D. M. Callender, C. M. Campbell, M.A., B.Sc., G. S. Carey, J. C. G. Carmichael, T. F. Cavanagh, A. M. Caverhill, J. H. Connolly, T. M. Cuthbert, Maurice Davies, F. I. Dawson, Jan Dommisse, C. B. Drew, H. J. Dunbar, J. F. Duncan, John Dunlop, S. A. Ellerbek (with distinction), J. S. Elliott, S. C. Ellison, A. N. Fell, Sydney Gilford (with distinction), Archibald Gillespie, D. P. Goil, Wilbert Goodchild, Thomas Gowans, Andrew Grant, J. P. Grant, B.Sc., Mabel D. Gulland, J. F. Haegert, T. B. Hamilton, D. J. Hamman, Howard Harding, Frances M. Harper, A. W. M. Harvey, A. W. Hanman, Henry Herd, M.A., Matthew Holmes, William Hume, R. C. Irvine, Harold Kerr, R. D. Kidd, James Kirkwood, H. A. Knight, Hermann Kramer, Vivian Langmore, Nora Lenwood, William Lilico, Duncan Lorimer, R. C. Low (with distinction), W. F. MacDonald, D. R. Macgregor (with distinction), Isabel M'Keand, William M'Lachlan, S. W. Maclean, R. P. M'Neill, C. E. Marshall, W. E. Marshall, J. K. Matheson, Paul Mathews, R. J. Mayberry, A. M. Moll, J. H. Montgomery, S. A. Moore, A. E. Morton, P. H. Myles, R. S. Munro, D. N. W. Murray, William Newlands, T. H. Osler, Sophie Palmer, J. H. H. Pirie, B.Sc., Herriman Porter, W. G. Porter, B.Sc., Agnes M. Pringle, J. J. Rennie, A. B. des Remedios, H. H. Roberts, A. B. Ross, M.A., T. W. P. Ross, A. J. Rowan, R. E. Russell, C. W. V. Rutherford, James Scott, J. S. Seaell, A. M. Sharp, M.A., E. S. Shaw, C. F. Shaw (with distinction), Maurice Sinclair, W. F. Smith, W. Smith, Robert Semple, Filbert Steyn, H. M. Stevenson, J. A. Thomson, F. G. Vickers, D. L. Wall, B. P. Watson, Percy Westerdale, John Weir, S. A. K. Wilson, M.A., [illegible] Wood.

NOTICE

[illegible] *Exchanges* [illegible] THE EDITOR, Dr W. RUSSELL, [illegible] *including* [illegible] THE SUB-EDITOR, Dr NORMAN [illegible]

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